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THE

Canadian Entomologist.

VOLUME IX.



EDITED BY

WM. SAUNDERS.

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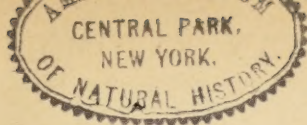
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Edited by William Saunders,
London, Ontario.

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ERRATA IN VOLUME IX.

The following corrections have been kindly sent us by J. A. Lintner, Albany, N. Y. :—

PAGE.	LINE.	CORRECTION.
29	13	For <i>melana</i> read <i>malana</i> .
90	5	" <i>robiginosaria</i> read <i>rubiginosaria</i> .
91	last.	" <i>cinerofrons</i> read <i>cinereofrons</i> .
92	27	" <i>Stenopsis</i> read <i>Sthenopsis</i> .
92	27	" <i>argentimaculata</i> read <i>argenteomaculata</i> .
96	28	" <i>Hemiluca</i> read <i>Hemileuca</i> .
98	2	" <i>Pholiosora</i> read <i>Pholisora</i> .
106	3	" <i>vautalis</i> read <i>rantalis</i> .
117	19	" <i>eurydice</i> read <i>eurytris</i> .
117	1	Place RHOPALOCERA before line 31, p. 116.
117	7	For <i>Nymphalides</i> B., read <i>Melitæa</i> Fabr.
117	27	dele <i>melinus</i> —a Californian species.
117	26	For <i>lucillius</i> read <i>lucilius</i> .
117	32	" <i>Palm.</i> read <i>Dalm.</i>
118	3	dele <i>tenuis</i> —a repetition.
118	7	Change SPHINGIDÆ to below HETEROCERA, line 31, page 117.
118	9	For <i>chamoenerii</i> read <i>chamæenerii</i> .
118	8	" <i>Carpenter</i> read <i>Charpentier</i> .
118	14	" <i>procris</i> read <i>Americana</i> .
118	24	" <i>Peraphora</i> read <i>Perophora</i> .
118	24	" <i>Hüb.</i> read <i>Harris</i> .
118	31	" <i>Hyparpax</i> read <i>Hyparpax</i> .
118	32	" " " "
120	6	" <i>Charandra</i> read <i>Ch'aradra</i> .
128	17	" <i>Smyrinthus</i> read <i>Smerinthus</i> .

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No. 1

HISTORY OF PHYCIODES THAROS, A POLYMORPHIC BUTTERFLY.

BY W. H. EDWARDS, COALBURGH, W. VA.

In the month of July, 1875, I chanced to be in the Catskill Mts., when Mr. Mead discovered the food-plant of *tharos*, as detailed by him in Vol. vii, ENT., p. 161, this being the common wild Aster, *A. Nova-angliæ*, and I obtained from him a cluster of eggs; also afterwards got others for myself by tying the females in bags over the stems of the same plant. The larvæ hatched, and while in their younger stages I brought them to Coalburgh. On the journey, stopping at several points, I had to give them leaves of such species of Aster as I could find, and they ate any and all readily—even German Asters from the garden. By the 4th of September they had ceased feeding, after having all passed two moults, and slept. Two weeks later, part of them were again active and fed for a day or two, when these gathered in clusters and presently passed their third moult, and became lethargic, each one where it moulted, with the cast skin by its side. I placed all the larvæ in the cellar, and so they remained till 7th Feb., when such as were alive (many had died from mould), were transferred to leaves of an Aster which had been forced in the green-house. The same day some were feeding. They all passed in due time two more moults, making a total of five in some cases. But whether those larvæ which moulted twice only in the fall did not pass three moults in the spring I cannot say. Further observations are necessary on this habit. The first chrysalis was formed 5th May, and its butterfly emerged on 18th, or after 13 days. Another emerged on 30th, after 8 days, this stage being shortened as the weather became warmer. There resulted 8 butterflies, all *marcia*, 5 ♂, 3 ♀, and all of the variety hereinafter designated C, except one ♀, which was var. B.

The first individuals of the species seen by me, in the field, at Coalburgh, were 3 ♂ *marcia*, on 18th May. A single ♀ was taken 19th, two

on 23rd, two on 24th, and these were all I saw up to the last date, although I carefully watched for them. Shortly after, both sexes became common. On the 26th I took 7 ♀, and tied them up in separate bags, on branches of Aster. The next day 6 of the 7 had laid eggs, the clusters varying from about 50 to 225 eggs each. They were always laid on the leaves, and usually on the under side of them, in rows nearly or quite straight, and touching each other. In the larger clusters the layers were three deep. These gave me hundreds of caterpillars, and each brood was kept separate. The butterflies began to emerge 29th June, the several stages being thus : egg 6 days, larva 22, chrysalis 5. There were four moults and no more, but much irregularity in every larval stage, so that some of the butterflies did not emerge till 15th July. Just after these larvæ hatched I went to the Catskills, taking one brood with me, and they reached chrysalis there, and in that stage were mailed back to Coalburgh. I returned by the time the butterflies from these chrysalids were emerging. There was no perceptible difference in the length of the several periods of this brood and the others which had been left at home, and none of either lot became lethargic. In my absence the larvæ had been cared for by a member of my family, charged to note carefully all changes. The butterflies from these eggs of May, with a single exception, were *tharos*, and this one was *marcia* ♀, var. C. This was the second generation of the season, counting the one which proceeded from the hybernating larvæ as the first.

On 16th of July, at Coalburgh, I again obtained eggs from several females, this time all *tharos*, as no other form was flying. The eggs hatched in 4 days, the larval stage was 22, and chrysalis 7; but as before, many larvæ lingered. The first butterfly emerged on 18th Aug. All were *tharos*, and none of the larvæ had been lethargic. This was the third generation in succession, and from the second laying of eggs.

On 15th Aug., at Coalburgh, I again obtained eggs from a single *tharos* ♀, and took them directly to the Catskills, and they hatched just as I arrived there, 20th. This was the fourth generation of the season from the third laying of eggs. The weather in Virginia had been excessively hot, and so I found it on the journey, but on reaching the mountains it was cool, and the nights decidedly cold. Two days after my arrival the mercury stood at sunrise at 40°. September was a wet and cold month, and I protected these larvæ in a warm room at night, and much of the time by day, for they will not feed when the temperature is less than

about 50° Far. The first chrysalis was formed 15th Sept., 26 days from the hatching of the larvæ, and others at different dates up to the 26th Sept., or 37 days from the egg. Forty per cent. of this brood, or 52 larvæ out of 127, became lethargic after second moult. I entered in my journal as follows: "16th Sept., 52 larvæ have ceased feeding at second moult." "26th Sept., fully one-half of the larvæ which had ceased feeding at second moult began to feed again, after resting a few days, and have now passed third moult." After which they became lethargic and so remained. I was much puzzled at finding in the summer that the broods then had but four moults, as I satisfied myself by repeated tests, and that, in each brood, inasmuch as I had noted down three fall moults in some cases, and two in the spring in the larvae of 1875, and written descriptions of them. Moreover Miss Peart had made a drawing of this third fall moult, and it did not correspond with any one of the summer moults, though plainly later than the second, and much smaller than the summer third, besides differing from it in markings. But in the brood of larvae, whose history I have just recited, the two moults show for themselves, as I have them now before me, and the third agrees with Miss Peart's figure. The species passes five larval moults in the winter brood, though perhaps but four in some cases, and there are but four in summer.

I returned to Coalburgh 15th Oct., and till I reached this place the weather on the way had been cold, with several frosty nights. So that for a period of 30 days, the chrysalids had at no time been exposed to warmth. The day I arrived, the butterflies began to emerge, and before the end of a week all that were living had come forth, viz., 9 males, 10 females. Several were dead, from bruises received on the journey. Of these 9 males, 4 were changed to *marcia*, var. C, 3 were var. D, and 2 were not changed at all. Of the 10 females, 7 were changed, 5 of them to var. B, 3 to var. C. The other 2 females were not different from many *tharos* of the summer brood, having large discal patches on under side of hind wings, besides the markings common to the summer brood.

Ten of the chrysalids of this brood I mailed from the Catskills to Mr. Lintner, at Albany, N. Y., asking him to keep them in a cool place and watch the result. I have before me from these chrysalids 6 butterflies, which emerged between 21st Oct. and 2nd Nov., all females, and all of var. B. Of the remaining chrysalids, Mr. Meske, in whose charge they were placed, writes, 27th Dec., that three seem to be still alive, and

one is dead. In nature I do not believe this species ever hibernates in the chrysalis stage. These butterflies were more completely changed than were those from the chrysalids brought to Coalburgh, as appears by comparison of the results in the two cases.

And 18 of the chrysalids I had placed on ice, 20th Sept., laying them in a tin box directly on the surface of the ice, the temperature of the house being 40° Far. Part were so placed within three hours after the forming of the chrysalis, and before they had hardened; others within six hours, and others within nine hours, and so all remained for seven days, that being the longest summer period of the chrysalis. On removing them from the ice, they seemed to me dead. They were soft, and when they became hard had a shrivelled surface. I brought them to Coalburgh, and discovered no sign of life till 21st Oct., when the weather suddenly became hot, the mercury rising to 87°, with a south wind. In two days 15 butterflies emerged, every one *marcia*, not a doubtful form among them in either sex. There were 10 males, 5 females; of the former 5 were of var. C, 4 of D, 1 of B. Of the 5 females, 1 was var. C, 4 of B. The other three chrysalids were dead. All the butterflies of this brood were diminutive, starved by the cold, but those from the ice were sensibly smaller than the others. All the examples of var. B were more intense in the coloring of the under surface than any I ever saw in nature, and the single male was as deeply colored as the females, and this also I never saw in nature. The examples of the other vars. were extreme, but not so unusual.

So much for the Coalburgh broods, and I am able to compare their behavior with those of the same species in the Catskills. When I went thither in June, arriving on the 18th, I found a few male *marcia*, var. D, flying, no females. This was exactly one month later than the first males had been seen at Coalburgh. The first female was now taken 26th June, and on 27th and 28th I took one female each day, all of them *marcia*, var. C. No more were seen, and no *tharos*, though I was daily in the fields. So that the first female was 38 days later than the first at Coalburgh. These three females I set on Aster, and two forthwith deposited eggs. The females of this species give fertile eggs when but a few hours out of chrysalis, just as I have shown, Ent., Sept., '76, that *Arg. myrina* may do.

The eggs thus obtained I mailed to Coalburgh, and returning soon after, found that they had hatched, 3rd July. The first moult occurred on the 9th, the second on 12th, the third on 15th, the fourth on 18th, and

the first chrysalis suspended on 20th, its butterfly emerging 29th July. So that the periods were, egg 6, larva 17, chrysalis 9 days. Five per cent. of this brood became lethargic after second moult. This, then, was the second generation of the butterfly of the season, from the first laying of eggs. All the emerging butterflies were *tharos*, no *marcia*, and all were characterized by an intense blackness of the dark portions of the wings, as compared with any Coalburgh examples. Also nearly all the females showed the discal band on fore wings above yellow, instead of fulvous. (This last peculiarity, the change in the band, appeared in some of the females of the *third* Coalburgh generation, but no other.) On the under side the reticulated lines were unusually heavy, and the marginal cloud and the brown patches largely extended and deep colored.

This second generation was just one month behind the second at Coalburgh. So far only could I trace the Catskill generation this year; but, as in 1875, Mr. Mead obtained eggs on the 27th July and following days, the larvae from which all hybernated, that would be the second laying of eggs of the season, and the resulting butterflies the first generation of the following year.

So that, in the Catskills, the species is digoneutic, there being two generations annually, the first of which is *marcia*, or the winter form, and the other is the summer form, and a certain proportion of the larvae proceeding from the first hybernate (so far as appears) and all those from the second.

At Coalburgh there are four generations, the first of which is *marcia* and the second and third are *tharos*, and none of the larvae from these have so far been found to hybernate; and the fourth, under exceptional circumstances, has produced some *tharos* and more *marcia* the same season, a large proportion of the larvae also hybernating. But had the larvae of this brood remained at Coalburgh, where the temperature for several weeks after they left the egg remained high, the resulting butterflies would have been *tharos*, and the larvae from their eggs would have hybernated. And here I may say that, in addition to the broods spoken of, I also raised others at Coalburgh out of the line of regular succession, as midway between the second and third generations, for example, and none of these larvae became lethargic, and the resulting butterflies were all *tharos*.

The altitude of the Catskill region in which I was is from 1650 to 2000 feet above tide water, and the highest peaks of the range were

directly near. The altitude of Coalburgh is 600 feet. As appears, the changing of the larvae from New York to Virginia, about 40° latitude, besides the difference of altitude, and the reverse, from Virginia to New York, had no perceptible influence on the resulting butterflies of the several broods, except in case of the last one, where the effect of the change of climate was direct on part of them, both as to the form and the size. The periods of the Catskill brood of June may have been accelerated a trifle by transference to Virginia, but not more, for the weather in the mountains at that time was warm; and the butterflies retained their peculiarities of color, which, as I have stated, were very marked. So also they retained their habit of lethargy, which, I may say in passing, is a very serviceable habit in a two-brooded species of butterfly, in a mountain region, and exposed to sharp changes of temperature. If the fate of the species depended on the last larval brood of the year, and especially if the larvae must reach a certain stage of growth before they were fitted to enter upon their hibernation, it might well happen that now and then an early frost, or a tempestuous season, would destroy all the larvae of the district. The species in the Catskills, in such circumstances, would probably be about as scarce as it now is on Anticosti.

On the other hand, the May brood, taken from Virginia to the Catskills, suffered no retardation of their periods, as compared with other larvae of the same generation left at home, nor was there any change of color, nor did any larva become lethargic. It might have been expected that all of the last brood taken to the mountains would have become lethargic, under the severe conditions to which they were exposed, but the greater number resisted change even in this habit. From all which we may conclude that it takes time to naturalize a stranger, and that habits and tendencies, even in a butterfly, are not to be changed suddenly.

The larvæ of *tharos* are at no period protected by a web, either one common to the community, as with *phaeton*, or one for each individual, after the habit of *mylitta*, according to Mr. Henry Edwards, in lit. They are exposed, just as are the larvæ of *nycteis*, and the only shelter either of these species have is what the leaf over them affords. I have left larvae of *tharos* on the growing food-plant, uncovered by any net, till after first moult, expressly to test the point of a web, as it had been suggested that these larvae might wholly change their natural habit in confinement, something that, so far as I know, larvae never do. The larvae of *nycteis* I have seen naturally on their food-plant until after

third moult, and there was not a thread of a web.* The larvae of *tharos* are sluggish, and a pretty sharp jar is necessary to cause them to drop from the leaf. This they do in a coil, and their bristles effectually protect them from all harm.

When about to moult, the larvæ bred by me ceased feeding, and collected in groups on the covers of the glasses in which I usually kept them, resting for about 36 hours. The body contracted, and as the time for the moult drew near, the skin became glassy as it separated from the newly formed skin beneath. The spines and bristles of the new skin lie folded down and back, and as the old skin, after splitting behind the head, is shuffled past the successive segments, the spines and pencils of hairs suddenly spring up, and the latter instantly become divergent. For some moments the old mask adheres to the new face, but the larva presently proceeds to rub it off with its feet. When the larva prepares for chrysalis, it spins a button of white silk, and hangs suspended for about 24 hours, its position being nearly circular.

As I have shown, *tharos* is polygoneutic in West Virginia, digoneutic in the Catskills, of New York. In a high latitude, or at a high altitude, we might then expect to find it monogoneutic, and restricted probably to the winter form *marcia*. And this is precisely what does occur in the island of Anticosti (about lat. 50°) and on the southern coast of Labrador opposite. Mr. Couper, who collected in 1873 on the island, informs me that *tharos* is a rare species there, though he saw it in localities 100 miles apart; that he saw no examples later than 29th June, from which date "it disappeared"; and adds, "I do not think any of the diurnals on Anticosti or in Labrador produce a second brood." When he left, 27th July, "the weather was becoming cold and very few butterflies of any sort were to be seen." Also, "the summer temperature of Southern Labrador and Anticosti are about the same." Of *tharos* from Anticosti Mr. Couper has sent me 14 males, 8 females. Of these males, all are var. D; of the females, 1 is var. C, 7 var. D. With these also came 11 males, 2 females from Labrador, all of same variety, D. All these examples are of reduced size, as might be expected from so cool a region.

Dr. Weisman states (See Can. Ent., Vol. vii, p. 232), that Dorfmeister was led by his experiments on the effect of cold on the pupae of butter-

* I found last summer that *nycteis* larvæ will eat asters as readily as *Actinomeris squarrosa*, which hitherto I had fed them on.

flies to believe that temperature exerts the greatest influence during the turning into chrysalis, but nearly as much shortly after that time ; and he considers it very possible that a period may be fixed at which the original tendency might be diverted more strongly. As related above, the chrysalids of *tharos* which were subjected to cold three hours after forming reached the same result as those which were exposed six and nine hours after forming. The period of exposure, 7 days, did not seem to me at the time very long for the purpose in view, especially as in Dr. Weismann's experiments the exposure had been from 34 days to three months. This too at a temperature of 33° Far., while in case of *tharos* it was but 40°. It is true, the greater part of the chrysalids of *tharos* which did not have an exposure to this artificial temperature also produced the winter form of the butterfly, but on the other hand some were not changed at all, whereas in all the chrysalids subjected to ice the change was complete and extreme. Nevertheless it would have been more satisfactory had chrysalids of the summer brood been experimented with, and if I live to another summer, I will test the matter. It seems to me very probable that a much shorter exposure to cold immediately after the forming of the chrysalis—a day or two, or even a few hours—may be found to divert the direction of the form, in this species.

There is a very great range of variation in the winter form. 'It exhibits at least four well marked types, and there are sub-varieties about each of, and connecting, these. The first, A, has the basal area of under side of hind wings (which area comprises half the wings, and is occupied by the reticulated lines, while beyond is a clear field for a certain space) whitened or silvered, as is also the whole series of sub-marginal crescents, and there is either no marginal cloud, or but the slightest ; the extra basal space buff. A sub-var. of this has the basal area whitened, but the rest of the wing clouded, and is between A and B. The second, B, has the whole surface, except a narrow border along costal margin, dark brown, running into blackish, but with a clear white or yellow belt formed of the outer reticulated lines, across the disk. Its principal sub-variety has the brown area broken, discovering a yellow ground, the belt remaining white, and is between B and C. The third, C, is variegated and gay, the ground being of a deep rich yellow, the marginal cloud extended quite to the belt, and ferruginous in color ; a large patch on the disk and another on costal margin, both ferruginous ; the reticulated lines of same color and distance, and a lilac flush over the whole hind margin. Sub-varieties of this have the

ground in shades of buff instead of yellow, the cloud and patches brown instead of ferruginous; sometimes the discal patch large, triangular and occupying a large part of the basal area; or in the form of an oblong band extending from middle of the wing to the inner margin, and met by a similar band filling the cell. C passes by grades into D. The fourth, D, has the ground color reddish-ochreous, the lines ferruginous, as also the extra discal points; the cloud and both patches pale brown, often a mere wash of color; on the fore wings the black spots are reduced and very pale, and the margin is pale fulvous and reddish-ochraceous. Of this type are the northern examples mostly; but in the Catskills and White Mountains, and in West Virginia, the red tint is less decided and the cloud and patches deeper colored.

And this variety D gradually shades into the summer form, particularly in the male, so that many examples of this sex cannot be distinguished from many males of the summer form. There is not much variation in these last, they being generally characterized by a restricted marginal cloud, obsolete discal patch, and very small, if not obsolete, costal patch. But the summer females are of two distinct types, one closely like the male, and consequently also the male of var. D of the winter form; the other quite different from its male, characterized by large brown patches on disk and costa, and a diffuse marginal cloud. This finds its counterpart in the female of var. D, or at any rate agrees most nearly with it, the peculiarities of the winter form being exaggerated in the summer.

Of these varieties, A is rare, and has appeared in none of the butterflies bred by me. I have occasionally taken it on the wing at Coalburgh, and in the Catskills. Var. B is common in W. Va., and nearly all the females taken in the spring are of this type; in the other sex it is rather rare, most of the examples being of var. C. Through the South also as far as Texas, beyond which I have not followed the species, var. B seems to be the prevailing winter form. It becomes less abundant to the north of Virginia, appearing but occasionally in the Catskills. At Albany, neither Mr. Lintner or Mr. Meske ever met with it.

Var. C is common in W. Va., in the male, and somewhat so in the female. So also in N. Carolina, if I may judge by examples sent me by Mr. Morrison. But I have not seen it from farther South, nor from Texas. It is common in the Catskills, and is occasional even to the extreme northern limit of the species.

Var. D is rare in W. Va., but in the Catskills the male of this is most abundant of all ; the female much less so, being replaced by C and B to a great degree. Of 3 males, 3 females, sent me from New Hampshire by Mr. Whitney, and taken at random from his collection, all were of the winter form, var. D, except 1 female of the summer form. From Canada, Labrador and Anticosti, all the examples received were D, with an occasional exception of var. C. Of 4 males from Colorado, all were D ; of 2 females, 1 is D, 1 C. From Lake Lahache, Br. Columbia, lat. 54°, and perhaps the most northern limit of the species, I have 1 male D, 1 female C. From New Mexico even, taken high in the mountains, 2 males are decidedly of var. D, and similar to the usual type from Anticosti in markings, the under side also being like that, red-tinted.

(To be Continued.)

DESCRIPTION OF A NEW BOTIS ALLIED TO FLAVIDALIS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

I have received from Mr. Frank W. Langdon, of Madisonville, Ohio, a specimen (♀) of a new species of *Botis*, which I name *Botis Langdonalis* after its discoverer. It is one of the largest and most striking forms yet made known, and belongs to the group of *flavidalis*, with which it agrees in the general color of body and wings. The fore wings from base to first transverse line are clouded with fuscous, and stained with ochreous. The two discal marks are present, the orbicular a dot, the reniform a streak. The space between the exterior transverse or elbowed line and the subterminal line is much *wider* than usual, and this space is filled in with a broad fuscous band crossing the hind wings as well ; the lines are only indicated by the contrast of color. An ocher discal dot on hind wings. Beyond the broad common band the terminal space is narrowly yellow on both wings. Beneath white, opalescent, with discal dots and the broad shade band repeated. Palpi white tipped with ferruginous ; body white beneath. *Expanse* 37 mil. *Length of body* 18 mil.

NOTES ON MELOE ANGUSTICOLLIS.

BY W. BRODIE, TORONTO, ONT.

In the Editor's "Notes on Cantharides," published in the December No. of the ENTOMOLOGIST, there are some particulars in reference to *Meloe angusticollis* which differ somewhat from my own observations on this species, extending over a period of seven years. According to my experience, *Meloes* make their appearance in the perfect state about the end of August or beginning of September, when they feed greedily on *Ranunculus acris*. Later in the season, when the abdomens of the females are much enlarged, they pair, and later still—sometimes after the first frost—they deposit their eggs and invariably die that season.

The larvæ emerge from the eggs early the following spring, and I think attach themselves to bees generally on the blossoms of the willow. I presume this because I often find females about to oviposit near to willow bushes, but I have detected the young larvæ in the flowers of *Caltha palustris*, and suppose they will take to any early flowering plant.

In confirmation of these statements I submit the following from my notes on *Meloe* in the vicinity of Toronto, dating from 1870.

Although *Meloe* is common here, I have never found them much further to the north, and as I am pretty well acquainted with all parts of the county, I would say they are not found in the central nor in the northern portions of the County of York. This is curious, as in the better wooded sections the storing Hymenoptera are more numerous than about Toronto.

1870—Aug. 30th. In early morning saw several *Meloes* descending a white oak tree, in St. James' Cemetery, which tree was afterwards blown down and proved to be a *bee tree*. This would indicate that *Meloe* pupates in the hive, and when perfect, deserts it during the night.

1871. *Meloes* first seen Aug. 10th.

1872—Aug. 20th. *Meloes* feeding on *R. acris*.

1873—Aug.-Oct. *Meloes* very numerous, feeding on *R. acris*; found many females ovipositing in a cold, wet situation, after first fall frost.

1874—Aug. 29th. Found about forty *Meloes* closely huddled in a ball; they were not fighting, and although both sexes were present, do

not think they were pairing. None of the females had large abdomens, and when disturbed they all quickly ran away.

Sept. 1st—10th. Found about sixty *Meloes*, of both sexes, many of them pairing; feeding on *R. acris*, on a small miry patch, about one-fourth acre, bounded on the right by a small stream, which they could not cross; on the left, about 150 yards up a bank, were six hives of neglected bees. This is the same situation where, in 1873, I found females ovipositing after frost.

1875—Aug. Found *Meloes* in same localities as last season. Captured several females: fed them on *R. acris*: they began ovipositing Sept. 20th. Oct. 20th, all dead. The eggs were of an orange color, and placed in a hole about $\frac{3}{4}$ inch deep and large enough to receive the abdomen.

1876—Aug. 15th. *Meloes* first seen. Sept. 1st, found about fifty in a ball, as I had found them in 1874. Do not think they were either fighting or pairing: could not make out what they were doing; when disturbed they soon ran away. This season they were about as numerous as in 1875, in same localities at same dates.

From these notes, from my own recollections and from the recollections of my children, I infer that *Meloes* make their appearance about the middle of August, that they pair and oviposit before the winter sets in, and that they never survive the winter: and also that they are very seldom, if ever, found under stones in the neighborhood of Toronto.

[We are very glad to get these highly interesting and valuable notes from our esteemed correspondent, and hope to hear from him again before long. As *Meloe angusticollis* is rarely found in our neighborhood, most of the statements made in reference to it were given by us as the results of the observations of others.—ED. C. E.]

NOTICE.

Tortricide.—I shall be much obliged for specimens of *Tortricide* from collectors in all parts of the U. S. and Canada, as I am now working on that group. Credit will be given to all persons supplying me with material. It is desirable that notes should be furnished of food plant or date of capture. All material sent to me will be determined as fast as possible, and on the completion of my work, sets of specimens will be returned named to the contributors.

A. R. GROTE, Buffalo Society of Natural Sciences.

ON SAMIA GLOVERI AND COLUMBIA.

BY DR. H. HAGEN, CAMBRIDGE, MASS.

The type ♀ specimen of *Samia Gloveri* having been presented by Mr. Strecker to the collection in the museum of which I have charge, I have most carefully compared it with the type ♀ specimen of *S. columbia*. I am bound to state that *I cannot find* any difference except the rosy color of *Gloveri*, and there are no characters which I consider of value to separate the two species. I freely admit that the examination, however carefully made, of only two specimens, both of which are old and in poor condition, is scarcely sufficient to determine this point, but I wish to draw the attention of students who may have a larger amount of material for comparison, to the facts stated, with the hope that the true relationship of these insects may be determined.

The suggestion that *S. Gloveri* is perhaps produced by the different conditions surrounding it in the country in which it is found (a salt deformity) is very easily made, but I should object to such a conclusion until we are placed in possession of fuller information regarding the early stages of both species. It would be very interesting and important to know with certainty whether any other Lepidoptera from Utah and Arizona present similar differences in color, among the same or related western and eastern species.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

ERRATA.—Ante p. 19, tenth line from top, for “*Drura*” read *Denver*.
Ante p. 136, eighteenth line from bottom, for “*Philonome Staintonella*” read *P. Clemensella*.

Laverna grisscella Cham.

This proves on comparison of specimens to be identical with *L. Murtfeldtiella* Cham.

Gelechia glandifuella Zell.

Further examination satisfies me that *G. sella* Cham. is the same species.

G. gallaesolidaginis Riley.

The specimens bred by me in the Rocky Mountains (see *Cin. Quar. Jour. Sci.*, v. 2, p. 289) belong to this species, but as suggested (*loc. cit.*) they are much smaller and the markings are indistinct.

Gelechia roseosuffusella Clem.

I have received specimens of this species from Mr. J. D. Putnam, which were taken at Springlake Villa, Utah. It is very widely distributed over North America.

Glyphipteryx montinella Cham.

This species may be distinguished by the fact that the large dorsal streak is behind the first costal streak and opposite to the second, with which it is sometimes confluent; besides, the first costal streak is as large or sometimes even larger than the large dorsal streak. In some specimens there is a dorsal white spot on or near the base; the apical half of the fore wings is rather golden brown than golden, as I have described it. The form of the hind wings is like that of *G. equitella*, but much broader, while *G. exoptatella* has these of the same form, and not wider than in *equitella*, or but little so.

Coleophora bistrigella Cham.

In the description of this insect I have considered the golden or "pale sordid ochreous" as the ground color. It will perhaps be more easily recognized if we consider the white as the ground color, with two wide golden-yellow streaks from the base: the first being the widest and going to the apex, and the second near to the dorsal margin.

Gracilaria (Coriscium) quinquestrigella Cham.

A typographical error (I suppose) in the description of this species makes me say: "annulus about the middle of the third joint at its tip"; the words "and another" should be inserted after "joint." Possibly (though I do not think so) I have two species before me, though there is some variation in the ornamentation. The first four costal white streaks differ in length in different specimens. (These all point obliquely back-

wards, whilst the fifth one, separated a little from the others, points obliquely forwards.) The wing behind the fifth costal streak is a little darker than elsewhere, and some specimens may be said to have a large brownish apical spot. There is a dark brown hinder marginal line at the base of the ciliae, which are tipped with brown at the apex. The line of union of the white of the dorsal margin with the brown color of the wing is irregular, and in some specimens it is marked by distinct brownish spots, and sometimes the white of the dorsal margin contains behind the middle a narrow brown longitudinal line which passes obliquely down towards the apex.

G. ahivorella Cham.

I find a specimen of this species among a few species sent to me from Lake Villa, Utah, by Mr. J. D. Putnam.

Helice palidochrella Cham.

Though the larva is unknown, I am convinced that it feeds in some way upon *Gleditschia triacanthos*. In Kentucky it makes its appearance in the imago about the 15th of May, resting on the trunks of *Gleditschia* trees with the wings horizontal and a little divergent, and the head lowered and abdomen raised. Sometimes the fore wings are so densely dusted towards the apex as to give the appearance (to the inward edge) of a small brown spot lying along the base of the costal ciliae; the base of the costa is usually brown, and sometimes there is a small creamy patch on the wing before the first costal streak, which is a narrow triangle with the apex at the fold, and is sometimes margined before and around its apex with a creamy or pale ochreous color. The legs and abdomen are dark brown or blackish, annulate with white, and the anal tuft is white.

CANADIAN HEMIPTERA WANTED.

At the request of our esteemed correspondent, Dr. White, we gladly find space for the following notice, and trust that during the coming season some of our energetic collectors will devote some attention to this order and aid Dr. White by sending him material.—ED. C. E.

TO NATURALISTS AND OTHERS.

As I am at present working at the Hemiptera of the world, I should be very much obliged for specimens from any part. For the benefit of those who may kindly wish to help, I give a few hints on the collection and preservation of this neglected order of insects. Hemiptera (which include the various insects popularly known as Plant-bugs, Tree-hoppers, Cicadas, Fireflies, Aphides, &c.) resemble in general appearance Beetles, but have more membranous upper wings (or wing cases), and are usually of softer consistence, besides having their mouth provided with a rostrum or proboscis, instead of jaws. In size, Hemiptera vary from an inch or more to less than one line in length. In color they are also variable, some being exceedingly brilliant, others very obscurely colored. They inhabit trees, shrubs and low plants; some run about on the damp margins of streams and lakes, some inhabit the surface of the water, and others swim in the water or crawl on the mud below. A few live under the dead bark of trees, and are usually flat and dull colored. The best mode of catching those on trees and shrubs is by shaking the branches over an inverted umbrella; those that are found on or under low plants (grass or other herbage) may be collected by sweeping the herbage with a net (which can easily be made out of a ring—12-18 inches in diameter—of stout wire, attached to a stick, and having a bag of canvas sewn on to it). They may also be found by searching on flowers and leaves. Those at the margin of the water may be found by searching; those on and in the water by using a net similar to the sweeping one, but with canvas open enough to allow the water, but not the insects, to pass through. Rather shallow, still water, among weeds or in open places among weeds, are the best situations. Many species fly into houses at night, attracted by the lights. In habits these insects are variable: some move slowly, others run or fly with celerity, and others (Tree-hoppers, &c.) jump with great activity. As many species closely resemble each other, it is desirable that *all* specimens met with should be secured. It is also desirable that *small* species as well as large ones should be collected, as it is among the former that most undescribed forms may be expected. To kill and preserve these insects, all that is necessary is that on capture they are put in a bottle filled with spirits of wine (rum, whiskey, &c., will do). Care must be taken, however, that the bottle is kept filled with fluid, otherwise the specimens will be shaken about and broken. So in transit great care must be taken to guard against the evaporation of the spirit. The bottles,

if not filled to the top with specimens, should have the empty space filled with crumpled pieces of paper, then filled with spirit, and tightly corked ; all the bottles may then be packed into a larger one, or jar, also filled with alcohol and tightly corked.

In return for any specimens (few as well as many) kindly sent to me, I shall be happy (if wished) to return named specimens, or to give in return named British Lepidoptera, Coleoptera, Hemiptera, or Flowering Plants ; or in certain cases I shall be glad to buy specimens.

Communications may be addressed to

DR. BUCHANAN WHITE, Perth, Scotland.

CORRESPONDENCE.

DEAR SIR,—

In ENT. for Nov., Mr. Lyman calls attention to an apparent discrepancy between a statement made by me as to the appearance of the sexes of butterflies and the facts as he has observed them. My statement had reference solely to the butterflies emerging from chrysalids of bred larvæ. No one has failed to observe in the field that the males of most butterflies are seen from several days to two weeks earlier than the females. I have repeatedly mentioned this myself. See notes on *ajax*, on *aphrodite*, and *pseudargiolus*, in Butt. N. A., vol. 1 ; also, on *cybele*, ENT., 6, 124. Nevertheless, in breeding I have found that either sex may first appear, or they will alternate irregularly until the whole brood has emerged. See mention of this on page 11, Butt. N. A., where of two broods of *ajax* the females first emerged. It is so with all *Papilios*, *Colias*, *Graptas*, etc., etc., that I have bred in any numbers. Of course when one or two butterflies of a brood only were raised, the result would be of no value. Thus a single *diana* and a single *aphrodite* emerged out of a large number of larvæ hatched of each. But in other cases I have bred the butterflies by scores and hundreds, and the result was as stated. In case of *clyton*, the behavior was different ; see Butt. N. A., vol. 2. Why such differences between species of butterflies occur, or why bred examples should behave differently from those in the field, I do not attempt to explain.

W. H. EDWARDS, Coalburgh, W. Va.

ON THE HABITS OF AMBLYCHILA CYLINDRIFORMIS, SAY.

DEAR SIR,—

This beetle, usually considered very rare, is, I am satisfied, much more common than heretofore supposed.

I base this opinion on my own observations, and have a good collection to sustain it. Their peculiar habits are evidently the great cause of their rarity, and, once understood, I am positive they will become quite common.

Their geographical distribution is, so far as is now known, rather limited ; yet there is now no reason to suppose that they will not eventually be found extending over a large portion of Kansas and Colorado.

The following is such as I have learned concerning them :

Nocturnal (Crepuscular) rarely being taken until after sunset, and occasionally in the early morning. Found usually along clay banks, where they live in holes generally made by themselves, where they find that seclusion so congenial to their nature. The state of the weather affects appreciably this insect. When cold and blustery they remain concealed, preferring a warm, balmy air ; occasionally a *warm, cloudy afternoon* will entice them from their retreats, but this is rarely to be expected. Like the rest of the *Cicindelidæ*, they are predaceous. They also feed on effete matter. In many of their habits they are like *Asida*.

HARRY A. BROUS, Manhattan, Kansas.

ON CAPTURING CATOCALAS IN THE DAY-TIME.

DEAR SIR,—

According to promise, I give you my method of capturing *Catocalas* in day-light. I very seldom take my net with me when hunting them, as they are such lively insects when in the net that they are sure to injure themselves by rubbing the scales off the thorax, which spoils their appearance. I take with me a long blue beech sapling, a wide-mouthed wine-glass with the bottom broken off, a piece of pasteboard and a small bottle of chloroform. When on the ground where I usually hunt them, which is a wood of white oak and hickory, I commence by rubbing the blue beech stick quickly up and down the side of the tree. The *Catocalas* usually settle low down on the trees, and when disturbed by the noise made by rattling

the stick, they fly off to some other tree near at hand, where they settle with head down and wings closed. I then go quietly up and place the glass over the insect, and with the other hand push the pasteboard under the glass and secure it; a few drops of the chloroform having been poured on the pasteboard, the moistened part is slipped under the glass, and in a very short time the moth is quiet, when I pin it and put it in my box, and start for more game. In this way I rub every oak and hickory tree that comes in my way. I find that the insects prefer the trees of medium size and that some of the darker-winged varieties are oftener met with on the hickory and red oak; yet from the white oak I have obtained by far the greatest number of species and specimens.

The best time in the day for operating is, I think, from 1 to 4 p. m. As the evening advances the moths become more restless and often alight so high up on the trees as to be out of reach. In such cases I have sometimes tied the glass to the pole, and when secured, have drawn them carefully down, rubbing the glass against the bark; this, however, requires to be done very carefully, or the insect will be injured. Sometimes the insects settle with their wings open and head pointing upwards, when they are much more difficult to approach, and if disturbed, will often fly upwards and settle high on the tree.

As to weather, I have succeeded best after a very warm day and night, with the wind southerly; if the wind is a little strong, so much the better, as the moths will not then fly so far when disturbed. They always sit on the north side of the tree, and when the wind is easterly or northerly very few will be found. I have tried the Cyanide bottle, but prefer the wine glass and chloroform, as I think that when treated in this way the specimens have a fresher look. When the weather is windy, I have often observed the black-winged varieties fall to the ground when disturbed, and hide themselves among the grass. In the manner thus detailed I have captured *Catocalas* for seven years past with much success.

—
WILLIAM MURRAY, 115 Maiden Lane West, Hamilton.

—
LARVA OF THYREUS NESSUS.

DEAR SIR,—

I am not aware that any description of the larva of *Thyreus* (*Amphion*) *nessus* has been given, so I send you the following extract from my notes:

Mature larva of *Thyreus nessus* Cram.—Two and a half to three inches in length, tapering gently from the fourth segment to the head. Color—uniform chocolate brown, thickly dotted over the body, and particularly along the dorsal line, with dark amber, of which color are also the eight lateral or stigmatal stripes. Anal horn on eleventh segment, very short, one-fifth of an inch in length. Very sluggish in its movements, showing none of the irritability of *T. Abbotii* when touched. When at rest, it stretches itself at full length along the leaf, or leaf stem, of the plant on which it feeds, never raising or retracting the anterior segments.

Pupa dark brown; formed either among rubbish on the surface of the ground, or slightly beneath the surface. Tongue case internal, not visible.

Feeds on fuchsia. Pupa 11th, 12th, 13th July. One imago on 8th August. Two others not yet emerged, and probably will winter in the pupa state. Notwithstanding the presence of the anal horn, and the difference in habit betwixt it and *Abbotii*, I regard *nessus* as a true *Thyreus* and recommend its restoration to that genus.

Parthenos nubilus Hüb.—I propose to substitute for the above generic name, which is also occupied by a genus in Rhopalocera (Hüb. Verz. bek. Schmett., p. 38, 1816), the generic name *Catocalirrhus*, reading thus: *Catocalirrhus* W. V. A., *nubilus* Hüb. My reason for changing the name in Heterocera instead of in Rhopalocera (no law preventing it), is on the ground of convenience, the butterflies having a majority of species in this genus. Furthermore, I feel certain that after a little more investigation we shall be able to refer *Catocalirrhus* to *Catocala*.

W. V. ANDREWS, 36 Boerum Place, Brooklyn, N. Y.

BLACK VARIETY OF *P. TURNUS*.

DEAR SIR,—

In answer to Mr. W. H. Edwards' query concerning the northern limits of the black variety of *P. turnus* ♀, I would say that at Omaha, in this State, the dark variety is more frequently met with than the yellow one. Here at West Point, the species is not so common on account of the scarcity of its food-plants; however, we have both varieties in about equal numbers. The same can be said of this insect as far north as the Niobrara River, where the species seems to become quite scarce.

LAWRENCE BRUNER, West Point, Nebraska.

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No. 2

NEW NOCTUÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Glaea carnosæ, n. s.

Size moderately large; eyes naked; tibiæ unarmed; abdomen flattened, with a dorsal carina. Thorax carmine or vinous pink. Fore wings of the same hue over dull olivaceous; the stigmata indistinct, moderate, deep pink with yellow-olive powdery borders; lines obsolete; subterminal indicated and in color like the annulets to the ordinary spots; fringes clear pink. Hind wings lighter pink, with slightly obscure bases and concolorous fringes. Abdomen yellowish pink, with yellow anal hairs. Beneath marked with bright pink; no lines; traces of pink discal marks. Head deeper colored; antennæ pale; breast rich pink. *Expanse* 45 mil. *Hab.* Oldtown, Maine; *Mr.* Charles Fish.

I have previously seen a specimen of this fine species in the collection of Mrs. Bridgham, from Rhode Island, as well as the pink egg, if my memory serves me.

Fishia, n. g.

The tibiæ are armed; eyes naked, with lashes. Male antennæ brush-like. Cut of the wings as in *Mamestra* (*i. e., subjuncta*); primaries widening outwardly. Thorax with posterior tuft, and the base of the abdomen strongly tufted. The genus thus combines features of *Mamestra* or *Hadenæ*, with those of *Agrotis*. The fore tibiæ appear to be unarmed; the tongue weak.

Fishia enthea, n. s.

Dull coal black. Ornamentation like *Mamestra subjuncta*. Markings velvety black. A basal dash. Ordinary lines strongly dentate, approx-

imate inferiorly ; claviform touching t. p. line. Stigmata large, concolorous, with incomplete narrow edging. Orbicular large, decumbent. Reniform transverse. T. p. line forming a shallower, more strongly marked and wider sinus on submedian space. Black sagittate dashes surmounted with olive powderings (which mark the s. t. line) on subterminal space between the nervules are continued on terminal space, and become obsolete inferiorly. Hind wings paler, fuscous, powdered with blackish. At the base of the concolorous fringes on primaries a pale line, including pale points at extremity of nervules. No median line on hind wings ; a narrow black terminal line and pale line at base of fringes. Body concolorous ; tegulae and thorax faintly lined. Beneath paler, with discal marks on secondaries. *Expanse* 43 mil. Hab. Oldtown, Maine ; Mr. Chas. Fish, to whom the genus is dedicated.

Cosmia infumata.

I am indebted to Mr. Meske for the information that Dr. Speyer has compared this form (described by me under the allied genus *Orthosia*) with the European *paleacea*, and finds the two very closely allied. Also that *Mamestra dissimilis* var. *discolor* Speyer, is my previously named *Mamestra atlantica*, which may be held to represent the European species with us ; *atlantica* seems to be always distinguishable. Mr. Meske has also drawn my attention to the fact that the tibiae in *Homopyralis discalis* Grote are distinctively pilose.

TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KY.

In a former paper I have mentioned the fact then known to me only through Dr. Packard's "Record," that Prof. Zeller had described a large number of American Tineina, some of which would no doubt prove to be identical with some described by me. Since then, by the kindness of Dr. Hagen, I have obtained Prof. Zeller's paper, and such species as I have been able to identify by means of his figures and descriptions, are mentioned below, and in addition thereto I think it probable that a few (not more than three or four) other species will be found to have been

described by both of us ; but of these I am not by any means certain. I do not recognize *Xylesthia Clemensella* Cham. in any of his descriptions, nor do I find among them anything like the two species that I have described under the generic name *Polyhymno*, while his *Gracilaria* is certainly new. From the seeming abundance of the beautiful *Gelechia elegantella* Cham., I had expected to find it among the Professor's species, but it is not there. Indeed, considering the large number of species described from the same region (North, Middle Texas) by both Prof. Zeller and myself, it is a little singular that many more have not been found common to both collections.

Gelechia quinella Zell.

This is the Texan variety of *G. cercerisella* Cham., vide ante v., pp. 230 and 231. *Cercerisella* has priority.

G. leuconota Zell.

This may be *Phetusa plutella* Cham., and if so, *leuconota* has priority. But Prof. Zeller's figure represents a projection of the white of the dorsal margin into the dark color of the costal half before the middle, which is absent in my three specimens, or very faintly indicated, and the same may be said of the narrow oblique white streak behind the middle, and of the small black costal spot before the apex. But as none of my three specimens is now in perfect condition, this may possibly account for the difference. If the insects are not the same, they resemble each other closely, and both are allied to *Evippe prunifoliella* Cham.

G. pudibundella Zell.

I am not sure that I gather a correct idea of this species from Prof. Zeller's description ; but if I do, I think it will prove to be the species previously described by me as *G. rubensella*, the larva of which has been bred and described by Miss Murtfeldt. I have taken it in Kentucky and received it from Missouri and Texas.

Nothris dolabella Zell.

Has been previously described by me as *Ypsolophus eupatoriella*. If Prof. Zeller is right in referring it to *Nothris*, it is *N. eupatoriella*, which has not only priority, but tells the food plant. I have bred and captured it here, and have received it from Mr. Belfrage, collected in Texas. It is widely different from *N. griseella* Cham., also received from Texas. I

am now satisfied that *Begoe costalutella* Cham. is the same species, a little worn and with the tuft of the second palpal joint so evenly and smoothly recurved as to give us the palpi of a *Gelechia*. In some of my specimens of *eupatoriella*, both bred and captured, the blackish spot or streak over and above the fold resembles that of *Gelechia bilobella* as figured by Prof. Zeller, as much as it does that of his figure of *dolabella*.

G. serrativitella Zell.

Prior and equal? to *G. plutella* Cham. I think it is the same species, but Prof. Zeller's figure represents the dorsal margin darker than in my specimens, and the projections of the pale costal hue into the dark dorsal portion as more distinct, and the one before the middle is lacking in my specimens, which have a small whitish dot at the end of the cell not represented in the figure.

G. olympiadella Zell. has some resemblance in the white marking of the wings to *G. trifasciella* Cham., but it is clearly a very different insect.

G. glandifera Zell. has some resemblance to *G. (Sinoc) fuscopallidella* Cham., though quite distinct from it. The pattern of ornamentation is the same in both species, and in *G. obliquistrigella* Cham.

Æcophora determinatella Zell.

This is probably the same as *Æ. australisella* Cham., but if so, the figure is very imperfect, or was made from badly rubbed specimens. In *australisella* the circular yellowish spot at the end of the disc is entirely surrounded by the brownish color; is not connected with the white dorsal spot, and is preceded and followed by a narrow and faint silvery or grayish fascia. More properly, these grayish fasciæ are not composed of gray scales, but the brown scales both before and behind the fascia shine with a grayish lustre. In Prof. Zeller's figure, however, these fasciæ are not represented, and the spot instead of being completely round, passes out backward to unite with the dorsal white spot. In *australisella* this white spot is simply the dorsal end of one of the fasciæ, whiter and more distinct than the remainder. Still I have no doubt it is the same species, and *determinatella* has priority as the specific name. I have a worn specimen agreeing with Prof. Zeller's figure in all respects.

(As will be seen by refering to the June No., 1875, the description of

australisella was by some mistake not published, and believing it to be the same with *determinatella* Zell., I determined not to publish it.)

Æ. constrictella Zell.

The size and ornamentation of this species, as described and figured by Prof. Zeller, are so nearly identical with those of *Theisoa bifasciella* Cham., that I was at first convinced it was the same species, and can now, after the most careful examination, only doubt whether they are the same. *T. bifasciella* was described by me in the CAN. ENT. for 1874, and consequently, if they are the same, *constrictella* is the specific name by priority. But if they are the same, the reference of the species to *Æcophora* is certainly very wide of the mark. It is true the characters of the head and appendages of *bifasciella* might do for those of an *Æcophora*; and it was owing to these characters and the position of the insect in repose that I separated it under the generic name *Theisoa* from *Elachista*, to which it is, in my judgment, much more nearly allied than to *Æcophora*. The insect in repose sits, or rather stands, with the body elevated above the surface on which it stands, with the wings horizontal and a little separated or spread, and the head a little lower than the apex of the wings. But the wings are too narrow and ciliæ too long for *Æcophora*; and the neuration is widely different. The neuration and form of the hind wings is exactly that of *Elachista obscurella* (Ins. Brit., v. 3), except that the subcostal vein is distinct throughout its entire course; and the fore wings only differ from it by having the median subdivided into two instead of three branches; but one of these branches is furcate; and the second branch of the apical vein (the one going to the dorsal margin) is absent in *bifasciella*. The cell is unclosed in the hind wings, and the submedian vein of the fore wings is not furcate at the base. The neuration is still nearer to that of *Elachista præmaturella* Clem. Surely such an insect as this can not with propriety be placed with *Æcophora*! Prof. Zeller says: "*Fascia ante medium cinnamomea, exterius albido-marginata*," &c., while I describe it *loc. cit.* as "basal third of primaries pale saffron slightly suffused with fuscous," and "at the basal third of the primaries a silver white fascia dark margined internally," &c. A reference to Prof. Zeller's figure shows that both descriptions mean the same thing. He defines the color perhaps more correctly than I do. The color gradually increases in density from the base backwards, and just before the fascia suddenly becomes a little darker and ends in a narrow row of brown

scales ; in some specimens this sudden darkening does not take place ; it is gradual up to the line of dark scales. It is unimportant whether we say a cinnamon fascia margined behind with white, with Prof. Zeller ; or a white fascia dark margined before, as I have it. This fascia is sometimes in *bifasciella* much curved, as Prof. Zeller has it, while in other specimens it is almost exactly straight. The white fascia of Prof. Zeller is more distinctly defined behind than I have ever found it in *bifasciella*, where it gradually passes into the pale cinnamon yellow which increases in intensity to what I have called the second fascia ; this second fascia sometimes crosses the wing as in Prof. Zeller's figure, but is never so wide or so distinctly outlined behind, but perhaps more frequently it is widely interrupted in the middle so as to make a costal and opposite dorsal white streak, as I have elsewhere mentioned, and in a specimen now before me it crosses one wing, while in the other wing it is simply represented by a costal streak hardly reaching the middle : the dark costal triangular spot of Prof. Zeller is distinct in every specimen that I have examined, but I have never found in any specimen the opposite elongate, narrow, somewhat paler dorsal triangle which in the figure extends to the apex of the costal triangle. The small discal dot of the middle of the wing is sometimes present, and sometimes absent in *bifasciella*. I think the wing behind the first fascia is more correctly described as pale saffron somewhat suffused and dusted with brownish, than as cinnamon ; but some specimens are much paler than others. In *bifasciella* the costal margin behind the second white fascia is fuscous (but little paler than the costal triangular spot before it), and much darker than the remainder of the apical part of the wing, and forms a definite spot much darker than it is represented by Prof. Zeller ; and he represents a narrow whitish line extending along the base of the dorsal ciliae, widest at the apex of the wing and narrowing to a point at the beginning of the dorsal ciliae, which I do not find indicated in any of my specimens of *bifasciella* ; and the hind wings of this species are pale silvery yellowish, or perhaps as properly, pale luteous.

If my specimens do not belong to Prof. Zeller's species, the resemblance in coloration is astonishing, and if they do belong to it, then the form and neuration of the wings place it among the *Elachistidae*, and not in *Æcophora*.

(To be Continued.)

NOTES ON A COLLECTION OF CANADIAN MOTHS MADE
BY WM. S. M. D'URBAN, AND NAMED BY F. WALKER.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The collection which forms the subject of this paper was kindly presented to the Ent. Soc. Ont. by Mr. D'Urban, and the specimens are kept for reference in the form in which they were given, because they were determined by Mr. Walker, the labels all being in his handwriting and many of the insects being types of his species. Many of the species were collected in the valley of the River Rouge, and some of them are mentioned in two papers in the *Canadian Naturalist and Geologist*, vol. 5, pages 91-6, and vol. 6, pages 36-41.

"*Pyralis* n. sp.?" v., 95. The specimen here described is *Asopia devialis* Grote.

"*Dasychira clandestina*," vi., 36. This ♂ specimen seems to be a distinct species belonging to the genus *Gluphisia*.

"*Audela acronyctoides*," vi., 37. The species and genus in this instance appear to be good, and not otherwise known in collections. The specimen is in poor condition, but its ornamentation being marked, the species is quite recognizable; there are no antennæ remaining. Mr. Walker gives them as "slightly pectinated, branches sub-clavate." The species is slenderer, but distantly recalls *Platyserura furcilla*.

"*Bryophila* ? *spectans*," vi., 38. Is *Microcœlia fragilis* of Gueneé.

"*Microcœlia* ? *retardata*," vi., 38. Is *Acronycta dissecta* G. & R.

"*Cleora limitaria*," vi., 39. The specimen so named approaches very closely to *Lobophora vernata* Packard.

Two new species of *Cleora* and five of *Boarmia* are then cited by name, without description. Good specimens labeled with these names are contained in the collection.

"*Acidalia junctaria*," vi., 39. The specimen so labeled seems to be *Corycia vestaliata* of Gueneé.

"*Macaria* ? *subapiciaria*," vi., 40. The specimen so labeled is a true *Macaria*, and is the same species as *Boarmia inordinaria* Walker, cited merely by name on the previous page.

"*Melanippa propria*," vi., 40. The specimen is *Baptia alborivittata* Guenée.

"*Coremia? palparia*," vi., 40. The specimen so labeled is a species of *Bomolocha* (*Hyphena*), and evidently owes its specific name to its long palpi, so characteristic of *Hyphena*.

"*Cidaria lactispargaria*," vi., 41. This insect is a brown species of *Cymatophora* (*Boarmia*), with a white flecking on the transverse posterior line of the primaries.

"*Botys magniferalis*," vi., 41. This specimen is *Botis illabilis* Hüb.

The above species are all that are described in these two papers. The entire collection contains 193 specimens labeled as belonging to 149 species by Mr. Walker. A large proportion of the names given accord with names now accepted for the species. The following are exceptions, and it may be found here that in some instances Mr. Walker's specific names have priority.

"*Leucania insueta*." The specimens so labeled belong to *Heliophila commoides* (Guenée).

"*Hydroecia lorea*." This is not Guenée's species, but is *sera* of G. & R.

"*Hydroecia ligata*." This is *Hydroecia lorea* Guenée.

"*Nonagria? intractabilis*." This is *Eustrotia albidula* (Guenée).

"*Mamestra ordinaria*." This is *Hadena devastatrix* (Brace).

"*Mamestra unicolor*." The specimen is *Agrotis clandestina* (Harris).

"*Apamea finitima*." One of the specimens so labeled is not Guenée's species, but is *Mamestra lilacina* Harvey.

"*Apamea glaucovaria*." This specimen is *Mamestra albifusa* (Walker) of Grote's List (the same as *chenopodii* var. Speyer).

"*Homoptera contracta*" is *Homopyralis tactus* Grote.

"*Homoptera herminioides*." The specimen is in poor condition, but is clearly referable to *Epizeuxis*.

"*Plusia aerea*." This specimen is not Hübner's species, but is *P. aereoides* Grote.

"*Nephelodes signata*." The specimen is *Hydroecia semiaperta* Morr., and belongs to *Tricholita*.

"*Agrotis jaculifera*" is not Guenée's species, but is *herilis* Grote.

"*Calocampa vetusta*" is *Calocampa nuptera* Lintner.

"*Agrotis spissa*" is *Agrotis messoria* Harris.

"*Agrotis illata*" is the species determined as *Hadena suffusca* Morr.

"*Herminia concisa*" is *Epizeuxis aemula* Hübn.

"*Herminia clitosalis*" is *Bleptina canadensis* Guen.

"*Herminia clitosalis*" is a specimen of the same species without the black stigmata.

"*Herminia* n. s.?" is *Zanclognatha laevigata* Grote.

"*Herminia cruralis*" is not Guenee's species, but *laevigata*.

"*Bleptina surrectalis*" is *Pseudoglossa lubricalis* (Geyer).

"*Hormisa effusalis*" is *Epizeuxis aemula* Hübn.

"*Pellonia successaria*" is *Haematopsis grataria* Fab.

"*Balsa obliquifera*" is *Nolaphana melana* (Fitch).

"*Hypena cacalis*" is *Scoparia centuriella*.

These determinations may prove of value in settling some of Mr. Walker's unrecognized descriptions of North American moths.

DESCRIPTION OF A NEW SPECIES OF PAMPHILA FROM COLORADO.

BY W. H. EDWARDS, COALBURGH, W. VA.

Pamphila Snowi.

Male.—expands 1.1 inch.: size and shape of *Leonardus*, the hind wings somewhat less prolonged anteriorly.

Upper side of both wings light glossy brown; primaries have five translucent spots, namely, one sub-apical, oblong, narrow, cut into three equal parts by the subcostal nervules: three discal, the first being at the top of the upper median interspace, small, semi-oval; the next large, irregularly quadrate, crossing the next lower interspace, and the third on sub-median interspace, less transparent, more yellow, in one example clearly defined, sub-triangular, in the other diffuse; these three spots forming an oblique line back of and below the cell; the fifth spot is at

the outer end of the cell, a narrow transverse bar; the stigma long, narrow, a little sinuous on the middle, black, edged in the middle by rough dark brown scales on either side.

Secondaries have an abbreviated discal row of indistinct, small yellow spots, placed nearly parallel to the hind margin, and restricted to the discoidal and median interspaces, or very nearly so; in the middle of the cell a small yellowish spot, almost obsolete: fringes cinereous, those of secondaries lighter than the others.

Under side of both wings brown with a russet tint; primaries somewhat fuscous near base, in and below cell, and pale yellow in the submedian interspace: the spots repeated except the lower of the three, which is lost in the color of the interspace just mentioned; secondaries have the discal spots more distinct, yellowish, and there appear faint traces of obsolete spots which would complete the series to costal margin; the cellular spot small, distinct, rounded.

Body above brown, below the thorax gray-brown, about the collar yellow tipped; abdomen yellow-gray; legs brown; palpi sordid white, gray at tips; antennae fuscous above, grayish below; club fuscous for a narrow space on upper side, elsewhere russet.

From 2 ♂, sent me by Prof. F. H. Snow, and taken by him in Colorado, at Ute Pass, while in charge of the Kansas University Scientific Expedition, 1876. No others were taken, as I am informed.

The species is near *Leonardus*, from which it differs in not having the basal area of primaries fulvous, in not having two spots near hind margin in the discoidal interspace, in having the spots translucent instead of fulvous, and in having a distinct spot at end of cell; the stigma of *Leonardus* differs considerably also, being heavier, somewhat curved, and especially broken in on the lower median nervule, of which the posterior part is thrown back of the line of the remainder; the spots on disk of secondaries in *Leonardus* are placed as in the present species, but are larger, and either quite distinct or largely diffuse, examples varying. The under side of *Leonardus* is more red (cinnamon-brown), and the series of spots on secondaries is complete and distinct, as is also the cellular spot. In these wings the resemblance between the two species is closer than elsewhere. They form a very interesting group.

ERRATA.—On p. 6, vol. 9, second line from top, for 40° read 4°, and on p. 8, second line from bottom, for *distance* read *distinct*.

Fig. 1.



THE LUNA MOTH.

Actias luna Linn.

THE LUNA MOTH--*Actias luna* Linn.

BY THE EDITOR.

In No. 8, Vol. 7 of our journal, there is an interesting article on this beautiful insect by Mr. R. V. Rogers, of Kingston, Ontario. When that appeared we were unable to supply an illustration of the moth, but lately we have succeeded in obtaining a very beautiful one drawn and engraved expressly for our pages.

This moth (Fig 1) measures when its wings are spread from $4\frac{3}{4}$ to $5\frac{1}{2}$ inches. The wings are of a delicate green color, thickly covered with pale hairs as they approach the body. There is a purplish brown stripe along the front margin of the fore wings, which stretches also across the thorax, while a small branch of the same is extended to the eye spot near the middle of the wing. The eye spots are transparent in the middle and margined with rings of white, yellow, blue and black. The hinder edges of the wings are bordered with purplish brown.

The head is white, while the beautifully pectinated antennæ are of a brownish tinge. The thorax and abdomen are whitish or greenish white, thickly clothed with a woolly down, the former crossed by the purplish brown stripe already mentioned. The legs are purplish brown.

This lovely creature is not at all common in the neighborhood of London; indeed it can scarcely be called common anywhere in Ontario, although it is very widely and generally distributed. Seldom a season passes without some being captured in our midst, and occasionally we have had them fly in at the windows at night, attracted apparently by the light.

The larva, which is of a bluish green color, feeds on Hickory, Walnut, Butternut, and sometimes on Beech and Oak, and closely resembles that of *polyphemus*, from which it may be distinguished by its having a pale yellow lateral stripe, bands of the same between the segments, and a brown V-shaped mark on the terminal segment.

For fuller details we refer our readers to Mr. Rogers' excellent paper.

SUPPLEMENTARY NOTES UPON ARGYNNIS MYRINA, WITH
MENTION OF THE SPECIES BELLONA, ATLANTIS
AND CYBELE.

BY W. H. EDWARDS, COALBURGH, W. VA.

I was again in the Catskills, 18th August, this season, and remained there till October. On 20th August I found *myrina* abundant, and easily obtained eggs, laid 21st. These hatched 29th. The larvæ passed 1st moult 6th Sept., 2nd moult 11th, and by 20th had become lethargic, gathering in small clusters on the leaves which I gave them. A second brood hatched 22nd Sept., from eggs laid on 8th. Time, 14 days, or nearly double that of the other brood. These larvæ also reached 2nd moult and became lethargic. Still another brood I obtained a week later, and when I left the mountains these had not reached the 2nd moult, but lingered after the first. The weather was cold, and though the larvæ fed, their periods were greatly retarded. I was endeavoring to see if the latest broods of the year might not perhaps hibernate immediately after the egg, as those of *cybele* do. But I discovered nothing to lead me to conclude that such was ever the habit of this species. These last larvæ were not living when I again reached Coalburgh.

The latest female *myrina* which I saw on the wing was on 16th Sept., but not having a net with me, I was unable to take her.

Argynnis bellona was less abundant, and at first seemed extinct, but I discovered that it frequented certain spots, especially where a particular species of *Solidago* grew, showing a great partiality for the flowers; and by often visiting these places, I obtained several females. These laid about fifty eggs on violet. First eggs 23rd Aug., and they hatched 31st. The larvae passed 1st moult 6th Sept., 2nd 11th, and some of them passed the 3rd moult 20th Sept. A few days after, both those which had passed the 3rd, and the others which had stopped at the 2nd moult, became lethargic. But I had sent some larvae of same lot, in their first stage, to Miss Peart, at Philadelphia, and all of them went on to chrysalis and imago.

A second brood of *bellona* from eggs laid 31st Aug., went on to 2nd moult, and all these became lethargic; and these, as well as the others, and the larvae of *myrina*, I have here at Coalburgh.

Bellona, in all its preparatory stages, is closely like *myrina*. The egg is of the same pattern, but rather longer, and the sides are less rounded; the larvae in first stages can scarcely be distinguished; in the last the spines of second segment are not lengthened as in *myrina*.

Atlantis was abundant, but the females set on violet laid no eggs, and I found on dissection that their eggs were yet immature. On 24th Aug. I took a pair of *atlantis* in copulation. It was in the forest, five miles from home, and I tied the pair in my net and suspended it on a tree. The next day, on returning, I found the pair separated, and brought the female home and set on violet. Two days after, 28th, there appeared to be but a single egg laid. The next day I discovered another, and by the 31st she had laid about a dozen, and I compassionated her endeavors and let her fly away. I kept all these butterflies alive on sugar and apple. The eggs hatched in 17 or 18 days. At the same time, I obtained a large number of eggs from other *atlantis*, which duly hatched. All the larvae forthwith began their sleep, as do those of *cybele* and *aphrodite*, *diana* and *idalia*, and that on empty stomachs, for as a rule they eat nothing.

And inasmuch as *atlantis* deposited eggs but a few days after copulation, and *myrina* does almost immediately after, we get light on an early brood of *cybele*, &c. For Mr. C. G. Siewers, of Newport, Kentucky, wrote me last summer that he had taken two pairs of *cybele* in copulation, in July. I think it probable, therefore, that these large species are digoneutic in West Va. and the Ohio Valley. The early brood of *cybele* (butterflies) appears in great force here by 1st June, on the clover blossoms, first the males, and in a few days the females. After the 15th to 20th June, they disappear, and in July I scarcely ever see an example. By 15th August fresh males appear again, and soon after fresh females, and I can always obtain eggs between 1st and 20th Sept. Just so with *aphrodite*. I should not have doubted there being two broods were it not for the fact that the several stages of the larvae which feed in spring are so remarkably prolonged that it seemed unlikely that between 15th June and 15th Aug. the several stages of egg, larva and chrysalis could be passed; and furthermore, that I had repeatedly dissected females of *cybele* in June, and when I could obtain them, in July and first half of August, and never yet found the least appearance of a formed egg. Nothing but fatty masses to represent them. But suddenly, about the middle of August, the eggs begin to take shape, and in a week or ten days are ready to be laid. But the hot weather of July and August, the mercury constantly running

between 80° and 95° in this region, and the nights (in which these larvae principally feed) being warm, may accelerate all the preparatory stages. While the evidence from dissection is but negative, Mr. Siewer's evidence, on the contrary, is positive, and if copulation takes place, we may be pretty sure that eggs follow.

BOOK NOTICES.

The Rhyncophora of America north of Mexico, by John L. LeConte, assisted by George H. Horn. From the Proceedings of the American Philosophical Society, Vol. 15.

This work, which fills a volume of 455 pages, is probably the most important contribution which has been made to the Entomology of America for many years. Its production must have been attended with immense labor and long and careful study. In addition to the work of classifying this numerous and difficult group of insects, a very large number of new species are described. We tender our sincere thanks to the authors for their kindness in sending us a copy of this useful and long needed memoir.

Manuscript Notes from my Journal, or Illustrations of Insects Native and Foreign; Order Hemiptera, sub-order Heteroptera. By Townend Glover, Washington, D. C.

In the 12th No. of Vol. vi., we called the attention of our readers to the issue of a valuable work by the same author on Diptera. The volume now at hand on the Hemiptera is published in similar form and style, quarto on heavy paper, printed on one side only, and the text a fac-simile of the author's handwriting. In this volume there are ten excellent plates, nine of which are devoted to the illustration of the species to which the notes refer, and one to the figuring of those portions of the insects on which their classification is based. There are figures of 238 species, many of the smaller ones in duplicate, one showing the insect magnified, the other of the natural size. In addition to the plates and their explanatory matter, there are 134 pages of text, 2 explanatory, 17 devoted to the classification of the Hemiptera, and the remainder to notes on the insects

themselves, their habits, the animal and vegetable substances they injure, the remedies used for destroying them, &c., all being referred to in alphabetical order.

This work is another evidence of the indomitable perseverance of this energetic Entomologist, and will be a valuable aid to those who desire to study this hitherto much neglected order. The author has again placed us under deep obligation for his kind remembrance of us.

Report on Insects Introduced by means of the International Exhibition, by Dr. J. L. LeConte, Dr. Geo. H. Horn, and Prof. J. Leidy. From the Proceedings of the Academy of Natural Sciences, Philadelphia, pp. 5.

We are glad to learn from the report of this committee that the insect pests observed among the grains, seeds, &c., exhibited, are chiefly such as are already known among us, and that there is not much likelihood of any great injury resulting to any agricultural product from the introduction of new enemies from this source.

The Rocky Mountain Locust: being report of proceedings of a conference of the Governors of several western States and Territories, together with several other gentlemen, held at Omaha, Oct., 1876, 8vo., pp. 58.

We are indebted to our esteemed friend, C. V. Riley, for a copy of the above pamphlet, which contains much valuable information on the habits of this destructive pest, as well as a summary of the best means yet known for counteracting its ravages.

Life Histories of the Birds of Eastern Pennsylvania, by Thomas G. Gentry, Vol. 1.

This is an octavo volume of 394 pages, published by the author, who resides in Germantown, Philadelphia. It is a thoroughly practical work, dealing largely with the habits of the various species of birds as observed by the author, who describes their nests and eggs, gives very full and explicit information in reference to the character of their food, the results of careful and repeated observation in the fields and woods. It is this feature that lends a special charm to this interesting little book, which is written in a very pleasing style and supplies a want long felt. We heartily commend it to all our readers who are in any way interested in Ornithology. The 2nd volume, which will complete the work, will be issued shortly, and may be obtained from the Nauticalists' Agency, Salem, Mass.

CORRESPONDENCE.

DEAR SIR,—

Mr. Behrens (*p. 200, Vol. 8*) writes : “ Mr. V. T. Chambers is satisfied to get Tineidæ dead and dry, and even untouched by a pin.” “ Satisfied ” in this connection is almost too strong a word, and may be misleading. So a distinguished Lepidopterist of Europe has made an objection to my work on the ground that I only keep specimens packed in cotton, and that, unpacking them, I place them under a microscope and prepare my descriptions from the appearances thus presented. This statement, like the preceding by Mr. Behrens, comes from a misapprehension of the facts. I prefer always to have some of my specimens on pins and some of them with the wings spread. It is best to study them pinned and not pinned, spread and not spread. When the opportunity offers, I prefer in the first place to observe them closely alive, before I take them, and when the quantity of material suffices, I also examine them both spread and not spread after they are dead, with the eye, a simple lens, or a compound microscope, according to circumstances. Indeed, in by far the greater number of new species described by me, the insects have been examined not only in the conditions above mentioned, but have also been dissected ; as is evident not only from the published accounts of the neurulation of the wings, but much more by the multitude of drawings of the neurulation now in my possession. All of my Tineina from Texas and from Canada, and nearly all that I have received from Miss Murtfeldt, from St. Louis, have come pinned and spread. Mr. Behrens wrote to me that he preferred not to undertake the task of pinning these little things, and besides he had not time, and I replied that I would be glad to get them packed in cotton without pinning ; and all of his specimens have been sent in this way. I have also received a few specimens from one or two other Entomological friends in the same condition. This mode, however, does not answer for sending Tineina for any considerable distance. The antennæ, palpi and tufts of scales on the wings or elsewhere are almost invariably rubbed off, and the insect is otherwise worn and denuded, so that I have not attempted to describe one specimen in ten that has been received in this condition. This plan, or rather a modification of it, answers better for preserving Micros taken at home, and which do not have to be shipped. Of the greater number of my Tineina I have not attempted the preservation of many specimens at a time. Making but few exchanges, I have kept but very few for that pur-

pose, and for my own use, after using a sufficient number and in various conditions for generic and specific diagnosis, I have contented myself with keeping a few, not *packed* in cotton, but simply laid on a loose tuft of cotton, in a pill box, which being set away in the cabinet, the insect remains as perfect as when first placed there. Such specimens, if needed for future observation, I take by the legs in the stage forceps of the microscope, and they are in good condition for observation either under the microscope or without it, as they may by means of the forceps be conveniently turned and handled without danger of breaking them, and every part of the insect may be well observed unless—as sometimes happens—the wings are so perfectly closed as to conceal the upper surface of the abdomen. But these are simply specimens preserved for future reference. A few specimens of *very* rare species I have not attempted to pin and set because of the danger of injury to such rare species. A few others of the smallest species (as e. g., some *Nepticulæ*) I have treated in the same way, because of the certainty of injury, if not of absolute destruction, in the attempt to pin them. But in other cases my descriptions have been prepared from observations of numerous specimens in various conditions as to preparation. I have found the species which I have described from this locality very numerous, so that a morning's ramble any day from May 1st to November 1st will supply me with specimens of fifty species, and half a bushel of mined leaves. I have, therefore, not felt the necessity of preserving pinned specimens of such species. Indeed, some years ago I seldom took the trouble to pin and spread common species at all. In a series of specimens the wings of some would be found in one position, some in another, or more frequently I would separate the wings entirely from the body. But a few years ago I began to make a collection to be preserved as types of all my species. These were all pinned and spread. Unfortunately, during my absence in Colorado, the greater part of this collection was destroyed. One or more specimens of the greater number of species were fortunately preserved, and most of the other species can be supplied. This collection is now in the Cambridge Museum. It contains types—pinned and spread—of something over 200 species.

There are, however, serious objections to pinning and spreading many Tineina. Very few persons are able to make a good "mount" of the small species: it is well nigh impossible to do it without *some* denudation, and an amount of it which could not be appreciated in a larger moth, is ruinous in one of these little things. Many species are characterized by

tufts of raised scales, which are very likely to be removed in the attempt to mount them; and frequently the distinguishing specific characters are to be found either on the extreme margins of the wings, or in the apical ciliae, just where they are most likely to be removed or injured in pinning: the thorax, of course, is destroyed in small species. It is therefore best to make very careful observations before attempting to pin a "Micro." If a species is very rare, so that I desire to keep the specimen, I should want it pinned and spread; but if it was unique and small I should not run the risk. And when one keeps a cabinet of pretty curiosities, of course they are best pinned and spread. But for the purpose alone of scientific study or description, I would prefer the untouched insect, and except for the preservation of types, would deem pinning unnecessary.

V. T. CHAMBERS, Covington, Ky.

NOTES ON HYBERNATING BUTTERFLIES.

In No. 4, Vol. 7, of *Psyche*, Mr. Scudder gives some notes on early spring butterflies at the White Mountains, noticed during June 2nd to 5th. Speaking of *Vanessa F-album*, he says: "One or two specimens only were seen on the 4th, apparently just out of winter quarters; they appear later I believe than other hybernating *Praefecti*, and those seen were on the sunny side of a barn which had probably served as their winter refuge."

In this locality, as elsewhere, *V. antiopa* is the first butterfly seen in spring, but as far as my experience goes, *F-album* appears as early as *milberti* and the *Graptas*; I am not sure about *P. cardui* and *huntera*. Referring to my note book, I find the following dates for *F-album*: April 18th, 1874, one specimen observed; April 26th, 1874, a pair taken in *coitu*; May 14th, 1876—cold, late spring—a specimen taken at willow blossoms. *Antiopa* makes its appearance here as soon as the snow has melted off sheltered spots on the south-western slopes of Montreal Mountain. The earliest record I have of its appearance is April 4th, 1875; on that date I saw a specimen on the wing and found two others under a stone. *Antiopa* can be found under stones, on dry sunny slopes with scattered trees, every spring, but I never met with any other species in its winter quarters. Do they hibernate in places less exposed to the influence of the early spring sunshine? If so, may not this account for their appearing a week or two later than *antiopa*?

F. B. CAULFIELD, Montreal, P. Q.

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VOL. IX.

LONDON, ONT., MARCH, 1877.

No. 3

METAMORPHIC CHANGES OF PLATYSAMIA CECROPIA.

BY THOMAS G. GENTRY, PHILADELPHIA, PA.

In the early part of May, 1876, I secured a newly-developed female moth of the above species to a branch of the common red currant (*Ribes rubrum*). It was about seven o'clock in the evening of May 6th, to be more precise in regard to time. On the next morning, I visited the spot, and a lusty male was discovered in coition. This condition of things continued until the close of the day, when her amorous partner, lured by the presence of dusky night and midnight revels, gradually loosened his embrace, and hied him away to other scenes. During the night some fifty eggs had been laid, which continued to be deposited at intervals during the succeeding day, until the number had reached about seventy. These eggs were not arranged with any view to order, but were agglutinated in masses to the reposing surfaces, or appeared in small isolated patches.

They were beautifully elliptical in contour, and measured one-eighth of an inch in length, and one-twelfth in width. The thickness was about one half the width. They were yellowish-white in color, and thickly coated with a brown viscid secretion.

These eggs did not hatch until June 3rd. Another batch was laid by a second female on the night of May 9th, which hatched on the same day as the first. A third lot by another female was deposited on the 22nd of the same month, which hatched on the 6th of June, just three days after the first and second lots. During favorable weather I have known the eggs of *cecropia* to develop in six days. This being the case, it is evident that the necessary conditions were wanting in the above-cited instances. A temperature ranging from 80 to 90 degrees of Fahrenheit thermometer, and a comparative freedom from undue atmospheric moisture, are essential conditions.

At the time when the above deposits were made, the weather was more or less cloudy, and both light and heavy rains were of frequent occurrence. Such was its unfavorableness, that fears were entertained of the complete failure of my experiments. On many occasions, eggs were broken, and their contents examined with very strong magnifying glasses, to ascertain whether putridity had taken place. Within a week of the time of hatching, numerous eggs were examined, and the only evidence of change apparent, was a slight turbidity of their contents. The weather for a day or two previous had been exceedingly fine, and the heat rather powerful. This happy state of things continued with slight, unimportant changes, until the hatching process was over. Eggs, as well as chrysalids, can endure a strong degree of cold without injurious effects, provided transformation has not already commenced, when vitality receives a check from which it never recovers. An alternation of wet and dry, or of extremely cold and very warm weather, is exceedingly detrimental. May it not be that the extreme paucity of certain kinds of insects during some years is due to the causes which have just been noticed?

The caterpillar of this species (when hatched) is nearly three-sixteenths of an inch in length, and scarcely thicker than an ordinary darning-needle. Its general color is a jet black. It is armed with two dorsal rows of glossy black spiniferous tubercles, those on the second and third somites being the largest; and also two lateral rows on each side, making six in all. The antennæ are short, black, triple-jointed, and moderately tapering. The true legs are black, three-jointed, and armed with short, in-curved claws; the pro-legs occupy the 6th, 7th, 8th, 9th, 10th and anal segments, and are furnished with a double row of black ciliæ.

June 10th—First moulting takes place. The caterpillar now measures nearly one-half of an inch. At first, it is greenish-yellow, but gradually changes to a yellowish-brown, with a slight tinge of green when perfectly dry. The caput and star-crowned protuberances still remain a beautiful glossy black. Each somite, between the different rows of tubercles, is diversified with a pair of black spots which ultimately become conjoined, forming longitudinal lines throughout their entire length. Between the segments, they are continued as obscure bands.

With age, the color becomes a dark yellowish-brown. At this stage, the caterpillar ceases to feed, and becomes considerably shortened. It is

now perfectly inactive, and behaves as if dangerously ill. This state of things lasts for a couple of days, during which time the larva has completely changed its skin, and gathered strength for future labor.

On thrifty plants of the red currant growing in the sunlight, development is very rapid; whereas, caterpillars feeding upon plants growing in the shade, exhibit the most remarkable contrasts, even in the same brood. The latter are more slender, being one-eighth of an inch shorter, darker, and have olive-green constrictions. The head and tubercles are an obscure black; the body bands much darker. From careful watching I am satisfied that they pass into their next stage without the necessity of moulting.

June 18th—The caterpillar has changed its skin again. It now measures from seven-eighths to one inch in length. The time of changing apparently varies from five to eight days, depending upon individual vigor.

The general color, at first, is a light yellowish-green. The tubercles of the first somite have each a dark basal annulus, and a pale blue summit which is surmounted by seven black spines, six in a circle and the remaining one occupying an apical position, from which it projects either vertically or obliquely; the remaining tubercles upon the first segment are jet black, and furnished with six spines. The second and third series of dorsal tubercles are a deep flesh color, with spines similar in number and position to the foregoing. The 4th, 5th, 6th, 7th, 8th, 9th and 10th somites have lemon-colored tubercles, with black, longitudinal dashes, facing laterally; and the 11th segment is armed with one large tubercle, occupying a median dorsal position, which is surrounded by a circle of seven spines near the middle, and overlooked by two divergent terminal ones.

The lateral tubercles of the 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th and 11th segments, are glistening and bluish. The 2nd and 3rd are armed with six encircling spines, and one apical; while the others, with five, and, sometimes, six encircling spines. Each tubercle is marked with longitudinal dashes on both sides, or merely on the dorsal side. The 12th segment has four light blue tubercles, armed with six spines. Above the anal pro-legs, two light blue tubercles are visible, which are furnished with six black glossy spines in a circle, and two broad lateral dashes.

The four abdominal pro-legs have each a broad, irregular, quadrangular black patch, near the distal extremity, and a small semi-elliptical one near

the proximal end. The anal pro-leg on each side has two long, broad, oblique bands, inclining anteriorly.

The median dorsal line is marked with black dots which are arranged as follows : 3rd segment, posteriorly, a small dot ; 4th, two very small dots ; 5th, 6th, 7th, 8th, 9th and 10th segments, both fore and aft, two large jet black dots.

Between the dorsal and lateral tubercles, the arrangement is as follows : 1st segment, one linear, transverse dash, posteriorly ; 2nd to 10th inclusive, both fore and aft, each two nearly circular dashes ; 11th, one posterior dash.

Above the sub-lateral tubercles, exists another row. The 2nd and 3rd segments have each one in front ; 4th to 11th inclusive, each one small dot in front of a larger one. Below this row, between the pro-legs, there is also a small dot on each of the several segments.

Each of the 1st, 2nd, 3rd, 4th and 5th segments, below the sub-lateral row of tubercles, bears a single jet black tubercle, which is armed with a single spine, or a pair of divergent, similarly colored spines.

The true legs are black, conical, 3-jointed, and armed with a single black incurved claw. The pro-legs, with a semi-circular row of black ciliae, inwardly.

The head is lemon-colored, with two black, irregularly elliptical spots anteriorly, resembling eyes, which have a small triangular shield between them. There are also two smaller spots near the proximal end of the 3-jointed, conical antennæ. The basal joint of the latter organ is sub-truncate and lemon-colored ; middle, small, cylindrical, and concolorous ; and apical, setiform, hairy, and blackish. Upper lip, bi-labiate, greenish, and black on margin. Jaws and lower lip similarly colored with the upper lip ; palpi, 3-jointed, each joint being dark brown, with a greenish annulus near their lines of union.

Before moulting, the caterpillar assumes a bluish-green color. The dots of the dorsal row become smaller, the posterior dots, partially or entirely, disappearing. The tubercles upon the first segment become a jet black ; dorsal tubercles upon the 2nd and 3rd segments, a reddish purple ; lateral pair, a glossy black with bluish tinge at apex ; and the others, a beautiful black. The remaining dorsal tubercles are deep yellow, and have broad black patches on the sides, which are confluent posteriorly in certain cases. Lateral tubercles, black on the inferior two-thirds, and

bluish above. Sub-lateral, jet black, with pale blue apices. The dots between the dorsal and lateral rows of tubercles are much smaller than formerly, and have actually disappeared in several instances. Between the lateral and sub-lateral rows they are nearly gone in front, and entirely so behind. Upon the abdominal pro-legs they are broader below, and rapidly diminishing above. On the anal pro-legs, the two confluent spots have separated and grown elliptical in shape. That upon the head is somewhat longer and broader.

The jaws, lips and palpi have become more conspicuously colored, approaching the color of these parts in the mature caterpillar.

The spiracles, which all along occupied a middle lateral position on the 1st, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th and 11th somites, but, without being easily recognized from resemblance in color to surrounding parts, are now quite conspicuous. They are narrowly elliptical in contour, with the longest diameter arranged transversely, and have cream-colored centres with black borders.

The general color of the caterpillar upon the inferior surface, is a bluish green, with obscure patches of black between the segments. Along the middle of the dorsum, extends an obscure bluish band from the head almost to the last segment.

The caterpillars, at this stage, vary considerably in the time of moulting. Some reach this period much sooner than others, at least two days earlier, even in the same brood. It is the thrifty-looking caterpillars that are thus favored. The ill-favored ones contrast quite remarkably with the latter, in size, color and markings. A number of caterpillars was purposely confined to a bush of the red currant, whose leaves were small and sickly-looking. They thrived poorly, increasing but slowly in size, while their more fortunate companions of the same brood fairly outstripped them in size and vigor, and actually passed through an entire transformation in advance of them. At the start, they had no advantage over their brethren; all were favored alike. What could have wrought the difference? From the foregoing facts, the conclusion is irresistible that nutrition had been the force at work; the vigorous larvæ, being amply supplied with food of the very best quality, had rapidly added to their size; while their stunted companions, being supplied with plenty of innutritious diet, had remained almost stationary.

June 26th—The caterpillar has moulted for the third time. Its length

is one and three-fourth inches, and thickness nearly one-half an inch. The color of the middle dorsal line is bluish-green, and of the lateral walls, a beautiful pea-green. The dorsal and lateral dots and blotches have entirely disappeared, as well as those upon the pro-legs and spine-bearing tubercles.

The tubercles upon the 1st segment are a light blue, bordering upon pearl; concolorous with those upon the lateral and sub-lateral abdominal rows. Their spines still retain the primary black. The 2nd and 3rd segments have dark purple tubercles above, while the 4th, 5th, 6th, 7th, 8th, 9th and 10th pairs of dorsal tubercles, are a deep lemon. The 11th segment has one large central tubercle, equal in size to those upon the 2nd and 3rd segments, which are larger than the others. The 12th and 13th dorsals are a pale blue.

The pro-legs and true legs are yellowish green, except the lower part of the distal joints of the latter, which are similarly colored with the claws.

Upon each side of the caput, near the base of antennæ, are two dark spots. General color of head, pea-green; mouth appendages, light blue.

The under surface of the caterpillar is a light green.

July 4th—The last moulting occurs. The length is two and one-half inches, and the thickness one-half an inch. As soon as the skin is changed, the dorsal tubercles of the 2nd and 3rd segments, are yellowish brown, with a lower circle of eight black papillæ without spines, and a circle of six spines above, surrounding a central one. Fourth pair of dorsal tubercles yellow, with eight black warts near the base, and a circle of six black spinules above, surrounding a central terminal one; 6th, 7th, 8th, 9th and 10th each with two horizontal spines; 5th, with five spines arranged in the form of a pentagon; 11th, yellow, with a circle of six spines, near the base of which, anteriorly, are several irregular black blotches.

On the anterior margin of the 1st segment, in line with the dorsal tubercles, exist four blue wart-like prominences.

The 2nd and 3rd lateral tubercles are light blue, each furnished with a circle of six spines, surmounted by a central spine; 4th, a circle of four and one central; 5th, 6th, 7th, 8th, 9th and 10th, blue, with one central spine.

Sub-lateral tubercles, below spiracles, same size as the laterals, hairy, 2-spined, with rudiments of a second pair in some cases. Below these,

on the 2nd, 3rd, 4th and 5th segments, exist small blue tubercles tipped with double spines. On the 12th segment, alternating with dorsal and lateral rows, there are four blue tubercles, with a circle of six black spots near their base, and a circle of four spines and one central on the dorsal tubercles, and a circle of four spines on the laterals. In line with the dorsals, two blue tubercles with five black spines, two of which in some cases have nearly disappeared.

True legs, greenish yellow, with black incurved claws : pro-legs, greenish-yellow.

Spiracles narrowly elliptical, with pearly centres and black margins.

Antennæ, cream-colored, tipped with brownish, and having two dark kidney-shaped spots near their base. Upper lip, pearl-colored and deeply cleft; lower lip, similarly colored; palpi, short, hairy, and marked with dark brown blotches : jaws, pearly at base, and dark brown for the anterior two-thirds.

General color above, greenish blue; on the sides, pea-green, and of the same color below.

In many cases, the lateral and sub-lateral tubercles are a beautiful pearl color, which appears to be due to the character of the food, for it is a noticeable fact that the majority of the caterpillars which exhibit this color-change, are found feeding upon the leaves of the common plum (*Prunus domestica*).

July 21st—The larvæ commence to spin their cocoons. This requires a period ranging from three to four days. While the operation is in progress, a slight incision is made through a cocoon, which is instantly repaired. Three times is the experiment performed, and as many times is the cocoon mended. But the fourth time the caterpillar seems to take no notice of the rent, or, even if it does, it is unable to make good the damage by reason of the lack of necessary material. The cocoon being completed, the remaining efforts of the larva are spent in the rupture and separation of the epidermis, which is eventually thrust into the lower part of the cocoon. This is effected in about six days. The process is precisely similar to that which takes place in moulting.

Caterpillars in confinement, particularly in empty boxes, become exceedingly restless, and wander about for several days, as if in quest of something. This is especially noticeable in larvæ which utilize the leaves of the plants upon which they feed for cocoon purposes. Where the box

is small, and both the upper and lower surfaces are perfectly accessible, the absence of leaves is but little missed. But, on the other hand, where these substitutes do not exist, the chrysalis has been known to appear without the customary covering.

This fact seems to point to the conclusion that the cocoon is only a subsequent acquirement, which did not primarily exist. In climates where rains are of common occurrence, as protecting envelopes, they are indispensable. A chrysalis will endure a very low temperature while comparatively passive, with perfect impunity; but cannot endure excessive moisture without destruction.

Of the exact time which the chrysalis requires to develop into the imago, I can only say that it depends upon thermometric conditions; were the several larval transformations undergone in early summer, while the mercury is standing at 92 degrees, and were the chrysalis stage then assumed, it is probable that the moth would appear in about two weeks. We reason from analogy. *Actias luna* requires but a single day less than a fortnight to pass from the condition of pupa to that of imago, and surely *cecropia* could scarcely surpass this period. Cocoons that have been taken into the house in August, and kept close to a hot stove, have developed in January; while those which have been left out doors, seldom change before the middle of May. As far as I have been able to ascertain, this species is single-brooded.

Before bringing this sketch to a close, there are a few particulars which I shall touch upon, that came under my immediate notice during the season that has passed. It is a mistaken impression that caterpillars of particular species confine their feeding to certain plant-species, exclusively. During several years past, I have closely looked into this subject, and my experience has been otherwise. My observations upon *cecropia* have been both interesting and remarkable. In the neighborhood of Germantown, the leaves of the common red currant, constitute its favorite food. During the first and second stages, by which I mean the intervals before and after the first moulting, it entirely restricts its feeding thereto. But after the second moulting, it readily accustoms itself to *Ribes nigrum*, *R. grossularia*, *Prunus cerasus*, *P. vulgaris*, *Rosa blanda* and *Spiraea corymbosa*. A little later, I have tried numerous larvæ upon *Wistaria sinensis*, *Philadelphus inodorus*, *Syringa vulgaris* and *Prunus serotina*, with remarkable success. Subsequent to the last moulting, several caterpillars were induced to feed upon *Symphoricarpus racemosus*. Some cocoons which were produced by

larvæ reared upon the leaves of *Sambucus Canadensis*, are the largest that I have ever seen. They measure fully four and a half inches in length, and have a diameter of nearly three inches. They are less compact than those found upon any of the foregoing plants, being very light and considerably inflated. The chrysalis within is proportionally large. In some parts of the country, along the borders of thickets and waste fields, they are found in abundance, and thrive handsomely upon the elder. The moulting periods are shorter, and the chrysalis stage is attained at least a fortnight sooner than is usual. At first, where plants more congenial to the taste, are in close proximity, a disposition to stray thereto was discernible. To obviate this difficulty, perfectly isolated plants were selected, which proved highly successful. Frequent attempts to rear caterpillars before the first moulting was over, upon foreign plants, proved in every case an utter failure. It is doubtless true that instinct has much to do in the matter, but may it not be that the jaws and legs are so constructed at first as to be only adapted to cutting and holding on to the leaves of particular plant-species? This being so, with the further development of these organs, would certainly come the power of adaptability to take advantage of the changes thus introduced into their *environment*.

The food has certainly much to do with the color of the cocoon. Caterpillars feeding upon the leaves of the common red currant, produce silk of a deep reddish-brown color; while the leaves of the cherry, plum, and the several species of *Rosa*, give a light brown color, bordering on gray. Cocoons taken from *Spiræa*, *Symphoricarpus* and *Prunus serotina*, are invariably a grayish-brown. There is also plainly noticeable in caterpillars feeding upon these plants, with the exception of those feeding upon *Ribes rubrum*, a tendency to lighter colors, which in some cases is decidedly marked, as in the case of those feeding upon the leaves of *Prunus domestica*, where the lateral tubercles often display a beautiful pearl color.

That food has certainly much to do in determining the sexes among Lepidoptera, I think has been clearly shown in the writings of Mrs. Treat, and in those of the author, although leading authorities are disposed to think differently. But, notwithstanding their opinions to the contrary, I cannot be deterred from placing upon record my experience of the past summer with *Platysamia aceropia*. As before remarked, quite a number of caterpillars were constrained to feed upon the leaves of plants that betrayed anything but a healthy appearance. It has been already shown that

these larvæ were readily distinguished from their vigorous brethren in many particulars, such as size, color and markings. And, further, that in some cases growth was delayed, and even the time of moulting more than doubled; while, in others, either the first or second moulting was entirely dispensed with. An examination of their chrysalids reveals the startling fact that out of some twenty in my possession, all, with two exceptions, are masculine in character.

The question is often asked—Are there any checks to the undue multiplication of *acropia* in the shape of natural enemies? I answer in the affirmative. Certain species of *aves* prey upon them. But no enemies are more destructive than two of our commonest species of spiders, *Tegenaria medicinalis* and *Agelena nævia*, the former of which constructs its web upon bushes of the red currant, using a curled leaf for a tube. I have noticed the above species on numerous occasions engaged in dragging caterpillars into its dens. It is only while the caterpillars are young, before the first moulting has taken place, that these attacks are ventured upon. *Dermestes lardarius*, in the larval state, frequently attacks the living chrysalis when divested of its cocoon, and does not cease from its ravages until it has reduced it to a mere hull. Even the chitinous covering shares the fate of the softer parts within. In a few instances, these larvæ had penetrated the only door of entrance, by gnawing their way through the comparatively loose fibres of silk which occupy the centre of the basal extremity. Their presence was only detected by the removal of the cocoon. Several cocoons which I have in a warm room have recently yielded fine specimens of the following parasites: *Ophion macrum* Linn., *Exorista militaris* Walsh, *Chalcis maria* Riley, and *Cryptus nuncius* Say—the *extrematis* of Cresson. At least one out of every three which I raised during the past season, and the number was not short of two hundred specimens, has been infested.

THE NATURALISTS' DIRECTORY.—This pamphlet, recently issued, will prove a great convenience to all those interested in science. It contains the names of Naturalists, Chemists, Physicists, and Meteorologists, arranged alphabetically, the several departments separately indexed. It is well printed and interleaved with blank paper, on which additional names may be written. It is published by the Naturalists' Agency, Salem, Mass.

HISTORY OF *PHYCIODES THAROS*, A POLYMORPHIC BUTTERFLY.

BY W. H. EDWARDS, COALBURGH, W. VA.

(Continued from Page 10.)

I have had upwards of 500 examples of the species before me in making these comparisons, most of them bred, but many taken in the field during several years past, since my attention has been attracted to the variation manifested. Many others I have brought together from localities as far apart as those mentioned. And I can well corroborate the words of Drury, applied to *tharos*, now more than an hundred years ago: "In short, Nature forms such a variety of this species that it is difficult to set bounds, or to know all that belongs to it."

In most of the comparisons above made I have used the under side of the hind wings only, for the reason that here the markings are most decided and colors most varied; but there are differences in the fore wings also corresponding much with the others. On the upper side there is more uniformity throughout the species: but, as a rule, the winter form has the fulvous portions deep red, while in the summer generations the fulvous is usually paler, and often partly replaced by yellow, as before mentioned. The 1st summer generation at Coalburgh had much less of this change in the fulvous portions than the 2nd, and the 2nd corresponded in this respect with the 1st Catskill summer generation. But the upper side of var. A forms an exception, the black being paler, almost gray, and the hind margin of fore wing edged by a narrow band which is distinctly separated from the blacker submarginal patches. Usually these are confluent and concolored with the band, making in effect a very broad black margin. The blackish net work about the base is very open, the lines fine. A appears to be an offset of B in the direction most remote from the summer form, just as in *Papilio ajax*, the var. *Walshii* is on the farther side of *telamonides*, remote from the summer form *marcellus*. On the contrary, var. C leads from B through D directly to the summer form. A is farther from this last in all respects than are several species of this genus, and were it not for the intermediate grades, I do not think it would be suspected of any close relationship to the summer form. Variety B I conceive to be nearest the primitive type. Besides that this has appeared

constantly in the butterflies changed by cold, as related, it is common in this region, predominating over the other varieties. It is also found more or less as far north as New York, though there it is not common. And moreover its distinctive peculiarity of color is seen in the allied species *phaon*, inhabiting the Gulf States, and in *vesta*, Texas, which in some degree replace *tharos* in those regions. Both these are seasonally dimorphic, and both are restricted in the winter form, so far as I can learn, to the single phase denoted by B in *tharos*. And in their summer generations, both have a close resemblance to the summer *tharos*, though owing to the increased number of summer generations in the extreme south, permitted by the length of the season, there are phases of the summer form in these species not observable in higher latitudes. It is noteworthy that these two species, the only ones, excepting *Batesii*, on the Atlantic slope especially near to *tharos* (and what *Batesii* is, whether it is not another variety of the winter form of *tharos*, is not yet settled), should be seasonally dimorphic, while of the many other species of the genus belonging to our fauna, not one, so far as is known, shows any marked difference between its winter and summer generation.

The significance of these phenomena I take to be this: when *phaon* and *vesta* and *tharos* were as yet only varieties of one species, the sole coloration was similar to that now common to the three. As they gradually became permanent, or in other words, as these varieties became species, *tharos* was giving rise to several sub-varieties, some of them in time to become distinct and well marked, while the other two, *phaon* and *vesta*, remained constant. As the climate moderated and the summer became longer, each species came to have a summer generation; and in these the resemblance of blood-relationship is still manifest. As the winter generations of each species had been much alike, so the summer generations sprung from them were much alike.

And if we consider the metropolis of the species *tharos*, or perhaps the parent species back of that, at the time when it had but one annual generation, to have been somewhere between 37° and 40° on the Atlantic slope, and within which limits all the varieties and sub-varieties of both winter and summer forms of *tharos* are now found in amazing luxuriance, we can see how it is possible, as the glacial cold receded, that only part of the varieties of the winter form might spread to the northward, and but one of them at last reach the sub-boreal regions, and hold possession to this day as the sole representative of the species. And at a very early

period the primary form, together with *phaon* and *vesta*, had made its way southward, where all three are found now, and neither of them, so far as appears, having developed any marked varieties of the winter form.

[After this paper was written, and the first part of it in type, I received from Mr. Boll a fine series of *tharos*, *phaon* and *vesta*, from Texas, with the dates of capture accompanying each example. It appears that *tharos* there flies from February to November, and there must be in all six or seven generations during this period. Five of these are represented in the series sent. All the examples of *tharos* are of small size, resembling in this respect those from the far north. All, except the February examples, which are var. B winter form, are very dark above, the black intense and the fulvous deep red, and some of the males have the under side of the hind wings almost deprived of markings of any sort, and to a considerably greater degree than I have observed in more northern examples. But certain males labeled Sept., Oct., resemble surprisingly var. C of the winter form. I find the first of these phases, that of the plain wing, also in *phaon*, and among the examples of this species is a female labeled November, that is undoubtedly the winter form, var. B, and which would be expected to appear in February, after the winter. And this has led me to suspect, considering the effect produced on the Coalburgh larvæ fed in the Catskills, as before related, that a cool season during the time the fall brood is feeding, or a few cool days after the chrysalis is formed, may tend to change the form of such of the butterflies as will emerge before winter, so that they shall not differ from those which pass the winter in chrysalis and appear in February. That may happen naturally which was brought about artificially with the Coalburgh brood spoken of.

I have also received a letter from Dr. Weismann of 16th Nov., 1876, which by his permission I may give in this connection: "Naturally your experiments with *tharos* have greatly interested me. The case seems to me perfectly intelligible; *marcia* is the old, primary form of the species, in the glacial period the only one. *Tharos* is the secondary form, having arisen in the course of many generations through the gradually working influence of summer heat. In your experiments cold has caused the summer generation to revert to the primary form. The reverting which occurred was complete in the females, but not in all the males! This proves, as it appears to me, that the males are changed or affected more strongly by the heat of summer than the females. The secondary form

has a stronger constitution in the males than in the females. As I read your letter, it at once occurred to me whether in the spring there would not appear some males which were not pure *marcia*, but were of the summer form, or nearly resembling it; but when I reached the conclusion of your letter I found that you especially mentioned that this was so! And I was reminded that the same thing is observable in *I. levana*, though in a less striking degree. If we treated the summer brood of *levana* with ice many more females than males would revert to the winter form. This sex is more conservative than the male—slower to change.”]

I am at a disadvantage with this paper not to be able to give colored illustrations of the different forms of *tharos*, with the variations, as well as figures of the allied species mentioned, but I propose to do so fully in the Butterflies of North America.

It is the female of the summer form, and that variety of it which displays the brown discal patch on the under side of the hind wings, that Drury figured as *tharos*, in 1770, and exceedingly well. In some notes when the description of *marcia* was given, Trans. Am. Ent. Soc., vol. 2, p. 207, I discredited *tharos* of Drury, but wrongly, and for the reason that I had not seen the peculiar phase figured. It pleases me now to make correction. My description of *marcia* was based on the first three of the varieties designated in this paper. The 4th, D, I then knew nothing of, nor indeed should I ever have noticed it but for having bred it from the egg.

Cramer's *tharos* is stated to have come from New York, and reference is made in the text to Drury. The figures are coarsely drawn and rudely colored. Bois.-Lec. state this *tharos* to be identical with Drury's, but in his Lep. de la Californie, Dr. Boisduval says it is another insect, and he considers Drury's *tharos* not to be our Atlantic species, but a Californian which he calls *pulchella*. I received the type of *pulchella* from Dr. Boisduval, and it proved to be *mylitta* Edw., a species by no means so near *tharos* as is *pratensis* Behr, of California. *Cocytus* Cramer, ♂, fig. A, B, pl. 101, is *tharos* ♂ of the summer form, and fig. C probably is intended for female of same, but the text refers it to Surinam, and it is given with a doubt as to whether it belongs to the male figured or not. Mr. Scudder regards these as var. of *tharos* Drury. But Dr. Boisduval makes it synonymous with *morpheus* Fab., and locates it in So. California. And Mr. Butler, Cat. Fab. Lep., makes *morpheus* Fab. a syn. of *liriope* Cramer, and refers it to Florida. And Mr. Scudder rejects *liriope* as N.

Am. So that the synonymy is rather mixed, and I give the above as a sample of the difficulties caused by attempts at utilizing the illy-executed figures and indifferent descriptions of some of these old books.

However, Fabricius (Ent. Syst. 3, No. 479) describes *morpheus* as a N. Am. insect, and in language, which though brief, is applicable to the summer form of what for many years has been known as *tharos*. Parvus. Alae omnes integerrimae, fulvae, maculis margineque nigris. Posticae punctis sex nigris in strigam dispositis versus marginem posticum. Subtus anticae fulvae, nigro maculatae, posticae pallascentes strigis undatis, margine punctisque sex fuscis. And accordingly, as it is best to designate by name the dimorphic forms of any species, I call the entire species *tharos*, the summer form var. *morpheus* Fab., the winter form var. *marcia*, and take no heed of Cramer's figures.

The figures of the male *tharos* in Bois. and Lec., are not very exact either, but may be taken to represent the var. *morpheus*. But the female must have been drawn from *Batesii*, and evidently Dr. Boisduval had this insect before him when he wrote these words: "We possess individuals which we consider as varieties, of which the primaries are black, with some fulvous spots and a transverse macular band of the same color. The hind wings do not differ, *except that the lines on the basal area run together.* Beneath, *the hind wings are wholly deprived of a broken border; the fore wings have likewise a part of the border effaced, but that which remains is blacker than in ordinary individuals.*" An excellent description of *Batesii*.

My experiments have thrown no light on the position or history of *Batesii*, and inasmuch as this is certainly a winter form (though I am not yet able to say that it may not be a summer form also), and the only larvæ of *tharos* so far carried through the winter having been from the Catskills, where *Batesii* is never taken, I could not expect this last to appear among the resulting butterflies, even if it were only a variety of *tharos*. If I succeed in saving the hibernating larvae which I now have, most of which originated at Coalburgh, the point as to relationship of these species, or forms, may be settled this coming spring. *Batesii* is not common here, and I have taken perhaps a dozen examples in course of several years; all these were flying with *marcia*.

* DESCRIPTION OF PREPARATORY STAGES OF THAROS.

EGG.—Conoidal, truncated, depressed at summit, rounded at base the lower half indented like a thimble, the excavations being shallow and arranged in close and regular rows; the upper half smooth, with about 15 slightly raised vertical ribs, terminating at the rim above; color pale green. Laid in clusters on the leaves of any species of Aster. Duration of this stage 4 to 7 days.

YOUNG LARVA.—Length .06 inch.; cylindrical, largest anteriorly, the segments each well rounded; sparsely pilose, the hairs black, and on the anterior segments directed forward; color yellow-green clouded with brown; head ob-ovate, deeply cleft; pilose; color dark brown. Duration of this stage 5 to 6 days.

AFTER FIRST MOULT.—Length .1 inch.; cylindrical, stoutest in the middle segments; armed with 7 rows of short, fleshy, brown spines, each thickly set with short, concolored bristles; there is also at the base of body a row of small spines, similar to the others, one on each segment from the 3rd, and over the pro-legs two on each; the 2nd segment with a collar of minute spines; body striped longitudinally with light and dark brown and sordid white; the dorsum light brown edged with white, and on this brown area are two interrupted white streaks; on the side a dark brown stripe on light ground; and in line with the lower lateral spines a white ridge; under side, feet and legs brown; head sub-cordate, the vertices rounded, and across each a gray band; another band on front lower face; color shining black. Duration of this stage 5 to 6 days.

AFTER SECOND MOULT.—Length .22 inch.; same shape; the stripes almost the same, the white dull, the brown darker; head sub-cordate, dark brown or black; on each vertex a white spot and one on front lower face. To 3rd summer moult 3 days. Where the larva passed 3rd moult in the fall, the interval was from 7 to 14 days.

* NOTE.—As the publication of this paper has been delayed, I am able to say now (March 24th), that the hybernating larvæ spoken of have gone through their larval changes and are now in chrysalis, 11 of them. These all had passed 3 moults last fall, and have passed 2 since hybernation ended. As will be seen below, the coloration at both these moults differed in several respects from the summer coloration. I did not succeed in bringing alive through the winter any of those larvæ which hybernated after 2nd fall moult, but of those which passed 3rd in the fall, the larger part were living when I placed them in the greenhouse, 7th Feb'y.

AFTER THIRD FALL MOULT.—Length .3 inch.; the dorsum light brown, edged with faint white at the 1st lateral row of spines, the brown area showing two macular white streaks; below 1st laterals, a black stripe. the remainder of the side brown; a white ridge with 3rd laterals; spines generally brown, the bristles same, black-tipped; head sub-cordate, shining black; with a gray, illy-defined spot on each vertex, and another on each side of face; some gray points also back of the last.

AFTER FOURTH MOULT, IN SPRING.—Length .44 inch. Body yellow-brown, dotted with yellow-white; the spines short, stout at base blunt at top, yellowish at base, brown above; the bristles short, divergent, brown, black-tipped; along the dorsal row a black stripe; a yellow stripe runs with 1st laterals, usually broken and somewhat irregular, most continuous on either side of each spine; a yellow band in line with 3rd laterals; head small, cordate, bronze or black, shining, with a few black hairs: across each vertex a narrow yellowish bar; a yellow triangular spot on front lower face, at the lower angles connecting with a curved yellow bar which runs to the back of the head.

AFTER FIFTH AND LAST MOULT, IN SPRING.—Length .6 inch. Color blackish-brown, dotted, especially on dorsum, with yellow; the spines more tapering, stout at base, blunt at tip, mostly yellowish at base; the bristles brown, black-tipped; on dorsum a black stripe, but often wanting; a yellow stripe in line with 1st laterals, and a yellow band below 3rd laterals; in some examples there is a black stripe between 1st and 2nd laterals; head bronze, shining, with black hairs; across each vertex a narrow whitish bar, thickened at the front and bluntly barbed on outer side; in front a triangular spot, connecting at the lower angles with a sickle-shaped bar on side, both yellowish. In other respects like 4th summer moult. Length at maturity .85 inch.

AFTER THIRD SUMMER MOULT.—Length .45 inch. Color olive brown; the dorsum much specked and dotted with dull white; a dull white stripe in line with 1st laterals, and a band of same color below spiracles, above which is another band, rather indistinct, whitish, macular; under side dark brown; the spines brown, light tipped, many with yellow, sometimes orange bases; the bristles black; head cordate, bronze; a straight silvery bar across each vertex; a triangular white spot in front, connected with a curved white line on either side, and white on the mandibles. To next moult 3 to 5 days.

AFTER FOURTH AND LAST MOULT, IN SUMMER.—Length .80 to .85 inch.; when mature, .90 to .95 inch. Cylindrical; color dark brown, dotted with yellow, and striped with yellow and black, the yellow always dull; armed with 7 rows of spines, 1 dorsal, and 3 on either side, besides smaller spines, arranged as after 1st moult; the spines stout, tapering, dark brown, in part white-tipped, those of 1st and 3rd lateral rows more or less orange tinted at base: each spine beset with many stout, straight, black bristles: next below 1st laterals a blackish stripe, edged on the dorsal side by yellow: in line with the lower laterals a yellow ridge; head cordate, either black or bronze; on each vertex a transverse white band: in front a cordate yellow spot, and on each side a sickle-shaped yellow stripe. Duration 4 to 6 days.

CHRYsalis.—Length .50 inch.; cylindrical, thickest at 9th and 10th segments; head case narrow, excavated at the sides, nearly square at top; the mesonotum moderately prominent, compressed at summit, and followed by a slight depression; the anterior edges of the last four segments of the abdomen prominent, especially of the foremost, which is developed into a ridge: on the abdomen several rows of fine tubercles; the color varies, being light cinereous, covered with fine abbreviated streaks; or it may be cinereous on dorsum, the rest yellow brown: or a dull white mottled dorsally with brown; or wholly dark brown finely mottled with gray. Duration from 6 to 13 days, unless retarded by cold.

DESCRIPTION OF A NEW SPECIES OF HESPERIAN FROM TEXAS.

BY W. H. EDWARDS, COALBURGH, W. VA.

Pamphila Meskei.

Female—Expands 1.4 inch.

Upper side blackish-brown; primaries have the costal margin to cell and nearly to apex densely covered with fulvous; the basal area and the inner margin sprinkled with fulvous scales; and the cell wholly deep fulvous except towards the outer end, where through the middle runs an oar-shaped blackish stripe; midway between cell and apex an elongated yellow-white spot, cut into three by the sub-costal nervules, the one of these spots nearest costa nearly lost in the fulvous ground; across the disk an oblique band of yellow-white spots, the upper one small and in

the upper discoidal interspace, placed a little outside the costal spot, the lower one in the submedian interspace, the spots widening as they proceed towards inner margin, and the 3rd and 4th deeply excavated on the outer side. Secondaries have the costal margin blackish like the hind margin, but the rest of the wing is sprinkled with fulvous, and the inner half covered by long dull greenish hairs; between the cell and margin an extra discal bright fulvous bar crossing three interspaces; fringes whitish.

Under side uniform bright orange, only the inner margin of primaries and a narrow space below the cell to base being fuscous; the spots on primaries faintly reappear in paler color than the ground, reduced in size, and at the end of the cell are two faint, yellow, horizontal bars, one at either side of cell. Secondaries immaculate except for two or three yellowish points corresponding to the spots of the extra discal bar.

Body above covered with dull green hairs, the collar orange, and the hairs at base of antennæ partly orange-fulvous; thorax below yellow-white, the abdomen yellow, on the sides and at the end orange; legs ochrey and yellow-white; palpi orange, as are the hairs of the collar; antennæ blackish above, yellow below; club fuscous.

From a single example in the collection of Mr. Otto Meske. The species is allied to *attalus* Edw. and *seminole* Scud., but is larger, more brightly ornamented on upper side, and beneath is not to be mistaken for any other species, owing to its bright orange surface. The male yet unknown. Taken in Bastrop Co., Texas.

CORRESPONDENCE.

I think it would be beneficial if a portion of the journal-space were devoted each month to a notice of the localities, habitats, food and habits of some of our rarer species, the best methods and apparatus for their capture, and the most approved way of putting them to death without damage, as also of pinning, setting and preserving them. These matters may seem of but slight consequence to the practised collector, but they assume an aspect of the greatest importance in the eyes of a beginner. In this connection, if Entomologists throughout the province would relate their experience in successfully collecting certain families of insects, and describe any method, implement or apparatus which they have found advantageous, and at the same time record the date, time of day, locality

and habitat of their captures, a judicious selection of the same would, I think, add much to the popularity, and not a little to the utility of the journal.

The question of the localities I consider as of very great importance, especially when united with the season at which certain insects may be expected to appear. Entomologists visiting remote sections of the country would, if such observations were duly registered, be directed whither to go in order to obtain specimens of species which might be rare or wanting entirely in their own neighborhoods. For instance, I have never captured any of the *Lycænidae*, nor ever known one to be captured in the immediate vicinity of Belleville, though in Madoc, about 30 miles north, I saw them in great profusion in the middle of May, 1868. Again, *P. asterias* is very common in this town, while only a few stragglers of *P. turnus* are ever seen. In the township of Lake, about 25 miles northwest from Madoc, and a very wild district, *P. turnus* is abundant, while I did not observe a single specimen of *asterias* in three weeks of the height of the season.

I think it would also be desirable to give from time to time notices of works on the science, especially such as refer to the discrimination of insects, and to give a list of such books as are likely to be of service to young collectors. You will see that I am an advocate of the *propaganda*. Every collector is certain to meet with rare, and is not unlikely to capture hitherto undescribed species, and if "in the multitude of counsellors there is wisdom," so in the multitude of collections there is knowledge.

JAMES H. BELL, Belleville, Ont.

I found in opening some *ccropia* cocoons lately, two pupæ in one cocoon. These were of different sex, and in opposite position as regarded the loose end of cocoon; neither was perfectly formed, apparently owing to their being crowded out of shape in the limited space. The cocoon was one of the "loose" kind; both inner and outer cocoons and floss were uniform in texture, showing no line by which the work of two larvæ could be distinguished. There was, however, a rudimentary division on the inside of the inner cocoon at its close end, partly enclosing the abdominal end of the ♂ pupa. In writing of *Ophion macrurum*, p. 220, v. 8, I omitted the word "imago." *Ophion* pupæ would hardly be a rarity, since over 20 per cent. of *polyphemus* are thus affected, but *Ophion* imago in October and November are new to me. The cocoons were kept in a cold room.

C. E. WORTHINGTON, Chicago.

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The Canadian Entomologist.

VOL. IX.

LONDON, ONT., APRIL, 1877.

No. 4

NOTES ON THE EARLY STAGES OF SOME MOTHS.

BY L. W. GOODELL, AMHERST, MASS.

Mamestra adjuncta Guen.

Larva, 1 example—Body smooth, thick and uniform to the 11th segment, from which it tapers abruptly to the end. Cinnamon brown; a large sub-dorsal, velvety, dark brown shade on the 4th, 5th and 11th rings, and on each of the remaining rings, except the three first and last one, is a dorsal curved line, and two small roundish spots of the same color; two larger, square, dark brown dorsal spots edged with yellowish-white, on the first ring. Head roundish, as wide as the body. Venter dark brown. Spiracles white, edged with dark brown. Length when full grown, 1.4 inches. Changed to a pupa Aug. 30. Feeds on *Pteris aquilina* (common brake).

Pupa—Length 0.7 inch; subterranean; black, of the usual form, with a slender forked spine. Imago, June 27.

Apatela hamamelis Guen.

Larva, 9 examples—Body of uniform thickness, with a few short, scattered, whitish hairs on the sides. The color varies from pale yellow to yellowish-red. A row of connected, triangular, dark brown spots on the back, and obscure shades and spots of pale brown on the sides. Venter bluish-green. Head round, flattish in front, as wide and concolorous with the body. When not feeding it rests with its head turned to the side of the body. Average length, 1 inch. Feeds on the Chestnut. About the last of August they make cocoons of bits of wood and grains of earth on or near the surface.

Pupa—Length 0.5 inch, of the usual form and color. Imagines appeared June 3rd to 9th.

Eupithecia absynthiata Linn.

Larva, 4 examples—Body slightly attenuated posteriorly. Color pale red; an indistinct, brownish, broken dorsal stripe on the eight middle rings, and a wavy, pale yellow line on each side. Venter and anal prolegs tinged with bluish. Head as wide as the prothoracic ring, flattish and concolorous with the body. Length when fully grown, 0.6 inch. Found feeding on the flowers of the Cockscomb (*Celosia cristata*). Sept. 28th to 30th they made rather brittle cocoons of grains of earth just beneath the surface.

Pupa—Length 0.20 to 0.24 inch; obtusely conical; wing cases and anterior part of the thorax dark greenish; abdomen yellowish-brown. Imagines Nov. 4th to 10th.

Tetracis lorata Grote.

Larva, 1 example—Body attenuated anteriorly; 2nd and 11th rings slightly swollen. Color, when about half grown, light gray, tinged with brownish and variegated with ash; when fully grown, dark brown mixed with light brown and gray. There are about eight pairs of small, pointed, black warts on the back. Head a little wider than the prothoracic ring, not retractile; brown, with two small black spots, edged below with white in front. Length when full grown, 1.2 inch. Feeds on the Sweet Fern (*Comptonia asplenifolia*). Sept. 22nd it spun a thin cocoon, mixed with bits of leaves, and was transformed to a pupa on the 25th.

Pupa—Length 0.6 inch. Thorax and wing cases pale wood color, densely speckled with brown; abdomen reddish, speckled with brown; a row of black spots on each side, and a small, black dorsal spot on the anterior part of the thorax. Caudal spine flattened and rather short. Imago disclosed Jan. 20th by artificial heat.

Ephyra myrtaria Guen.

Larva, 23 examples—Body smooth and of uniform width; reddish brown striated with ochreous; a large sub-dorsal dark brown shade on each of the six middle rings, and a darker dorsal stripe. Head round and slightly bifid, a little paler than the body and larger than the prothoracic segment. Average length when fully grown, 0.7 inch. It is very much attenuated when young and of a brighter color. Feeds on Sweet Fern (*Comptonia asplenifolia*) and on the Huckleberry (*Gaylussacia*). When about to change to a pupa it fastens its anal prolegs firmly to the

under side of a horizontal twig, and slings itself by spinning a thread of silk over the middle of its body, which is fastened by two strands at each end.

Pupa—Widest and truncated anteriorly, tapering regularly to the tail, and with two ear-like protuberances in front. Color, body very pale flesh color, with the abdomen more or less thickly spotted with black; wing cases paler than the body, with a black streak along the upper margin; a small dorsal black spot on the anterior part of the thorax.

A variety of this species, of which I found thirteen examples, is dark brown with black sub-dorsal shades, which are edged below with grayish; there are also two small black spots on the back of the first ring of the body.

ON DEILEPHILA CHAMCENERII AND LINEATA.

BY THE EDITOR.

Both these members of the Sphinx family are found more or less plentifully in nearly all portions of the Provinces of Ontario and Quebec; *lineata*, as far as we have been able to learn, is more abundant in Ontario and *chamcenerii* in Quebec. They are both very handsome moths, and so strong and active when on the wing that it is difficult to capture them without injury. About twilight or a little later their period of activity begins, when they may be seen flitting about with spectre-like rapidity, hovering like the humming bird over flowers, into which their long and slender tongues are inserted in search of the nectar there stored.

They are much alike. In both the ground color of the fore wings is of a rich greenish olive, crossed about the middle by a pale buff stripe or bar, extending almost the whole length to the tip, while along the outer margin there is another band or stripe nearly equal in width, but of a dull ashy color. The hind wings are small, with a wide rosy band, which covers a large portion of the wing, while above and below, the color is almost black, the hinder margin being fringed with white. In the markings on the bodies they also resemble each other very much. There is a line of white on each side, extending from the head to the base of the thorax, and other less prominent longitudinal lines of white on the thorax.

The abdomen is of a greenish olive, having a reddish hue on the sides and spotted with white and black.

There are differences, however, which would enable the most casual observer to separate them without difficulty. There is a difference in size, *lineata* (fig. 3) being the largest, measuring when its wings are spread about three and a half inches, while *chamænerii* (fig. 2) rarely exceeds two and three-quarter inches. The central band on the fore wings in *chamænerii* is wider and more irregular, but the most striking point of difference between the species is that the veins of the fore wings in *lineata* are distinctly margined with white, a character entirely wanting in *chamænerii*. These differences will be readily appreciated by reference to the figures.

The larva of *lineata* varies considerably in color. Mr. Riley says : "The most common form is that given at fig. 4, where the body is of a yellowish green, with a prominent sub-dorsal row of elliptical spots, each spot consisting of two curved black lines, enclosing superiorly a bright crimson space and inferiorly a pale yellow line, the whole row of spots being connected by a pale yellow stripe edged above with black. In some specimens these eye-like spots are disconnected, and the space between the black crescents is of a uniform cream color. The breathing holes are either surrounded with black or black edged with yellow. The other form of the caterpillar (see fig. 5) is black, with a yellow line along the back and a series of pale yellow spots and darker yellow dots. This dark form is, however, subject to great variation, some specimens entirely lacking the line along the back."

According to Mr. Riley, it feeds upon purslane, turnip, buckwheat, water melon, and even grape and apple leaves, and is found in the larval condition during the month of July. Mr. Pyle, of Dundas, Ontario, has found it feeding on the common plantain. When full grown it is said to descend into the ground, where within a smooth cavity it changes into a light brown chrysalis, emerging as a moth in September.

LARVA OF D. CHAMÆNERII.

Described from three specimens found feeding on grape, July 5th.

Length, two and a half inches, onisciform.

Head small, rather flat in front, slightly bilobed, and of a dull pinkish brown color, with a black stripe across the front at base. Basal half of



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.

palpi yellow, upper half black. Mandibles black, with a patch of yellow between them and the black stripe.

Body above deep olive green, with a brownish tinge and a polished surface. Second segment with a cervical shield similar in color to head, its sides dull greenish, with two yellow dots. There is a pale yellowish dorsal line terminating at the base of the caudal horn; each segment from 3rd to 12th inclusive has a pale yellow spot on each side the dorsal line, about half way towards the stigmata, those on 3rd segment small and almost crescent-shaped, on 4th larger and nearly round, 5th still larger, nearly round, 6th, 7th, 8th, 9th, 10th and 11th about equal in size, nearly oval and larger than those on 5th. On 12th segment the spot is more elongated, and extending upwards, terminates at the base of the caudal horn. There is a wide but indistinct blackish band across the anterior part of each segment, in which the yellow spots are set; the sides of the body below the spots are thickly sprinkled with minute raised yellow dots. Caudal horn long, curved backwards, red, slightly tipped with black, and with a roughened surface; terminal segment dull pinkish; stigmata oval, yellow, shaded around with dull black.

Under surface much paler, color dull pale pinkish green, the pink color predominating from 5th to terminal segments inclusive, and with a number of very minute raised yellowish dots placed chiefly along the sides. Feet black; pro-legs pink, with a patch of black on the outside of each. One specimen spun a light web, binding a portion of the leaf in the manner of *pampinatrix*, within which it changed to chrysalis on the 10th of July, and from this the imago appeared on the 28th of the same month. The other two larvæ died before completing their transformations.

SIX NEW NOCTUÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Eustrotia mariæ, n. s.

Fore wings pale carneous brown shaded with dusky; terminal space more blackish. Median lines fine, black, approximate, angulate. A curved sub-basal shade on internal margin. Reniform narrow, outwardly curved or

oblique, white and contrasting, set in a dark suffusion of the disc. Subterminal line even, with a costal angulation. A fine dark terminal line at base of concolorous fringes. Hind wings pale, shining with traces of median shades and the fringes slightly carneau; abdomen concolorous with hind wings. Beneath fore wings dusky, hind wings pale with mesial shade. Fore wings above showing pale costal dots; beneath there are pale costal shades and the costal angulation of the s. t. line is apparently reflected. *Expanse* 21 mil.

Several specimens taken on the Lake Shore, near Buffalo, N. Y., in July, by Miss Mary Walker, after whom the species is named.

Thalpochares orba, n. s.

A large form resembling *mundula* in color and cut of wing, but stouter and with longer palpi. Its generic position is not assured. Fore wings dark brown, with the narrow median space almost black. The median lines are even, pale ferruginous brown, contrasting. The outer or t. p. line occupies almost the centre of the wing and is not angulate opposite the cell as is *mundula*, but obtusely bent. A faint festooned line follows the t. p. line. The irregular subterminal is relieved by a following pale shade. The reniform is a small ringed spot. No traces of the other stigmata. Fringes concolorous, cut outwardly with pale. There is a delicate violet reflection over the fore wings. Hind wings and abdomen blackish fuscous. Beneath fuscous with discal dots and a common even mesial line relieved outwardly by pale shading. *Expanse* 21 mil. Loc., Demopolis, Alabama.

Spragueia plumbifimbriata, n. s.

Among the specimens belonging to this genus collected by Mr. Bel-
frage, in Texas, are several under the number "127" which I cannot refer to *dama* or *leo*, although closely allied to these. The fringes in *dama* are orange colored with a leaden fleck opposite the cell; of *leo* lead-color except at the internal angle, where they are fulvous. In the new species they are entirely plumbeous. The thorax and fore wings at base and along costal region are very pale yellow, like the palest tint in the other two species. The rest of the wing is taken up by two broad lead-colored patches or bands, separated by a narrow rusty line at the middle of the wing from the middle to internal margin. The first band stretches narrowly to costa without the first transverse line, which is barely indicated

The discal spot is situate without and above the extremity of the mesial line, which is apparently the lower portion of the transverse posterior. The terminal margin is narrowly fulvous. Hind wings and abdomen pale fuscous, not so dark as in allied species. Beneath paler than in its congeners. *Expanse* 14 mil.

This cannot be the *onagrus* of Gueneé, which seems to me to be the same species as *leo*.

Fruva, n. g.

Although the neururation agrees with *Spragueia*, the three forms here included differ by the bulging clypeus and the infra-clypeal plate. In *fasciatella* this is exaggerated and the surface of the clypeus is flattened or slightly depressed, reminding us of *Tarache*. The species are rather longer winged than *Spragueia* (*agrophila* of Gueneé in part) and differ by their plain unspotted fore wings. The three species I would here include are *F. tortricina* (Zell.), *F. fasciatella* Grote (which is the generic type) and the following :

Fruva obsoleta, n. s.

Allied to *tortricina* rather than to *fasciatella*, but resembling the latter more in color. The front does not seem to be shallowly depressed. Entirely plain colored. Fore wings fuscous, overlaid with ochrey scales, without markings. Hind wings pale fuscous with whitish fringes. Beneath whitish, glistening ; fore wings with blackish disc and fringes, the latter whitish on secondaries. *Expanse* 19 mil. Algonquin, Illinois, June 1 ; Dr. Nason.

The species *Tarache angustipennis* comes very near *Fruva*, and may ultimately be removed to the latter genus.

Tripudia, n. g.

The little species with simple and rather short antennæ belonging to this genus are among the frailest of the family. They are dark-colored, beneath shining, and remind one of certain *Pyralidæ*. The body parts are small in proportion to the wings ; the abdomen not exceeding the secondaries. The wings are wide, outwardly full. Eyes naked, palpi rather long, divaricate, pointed. All the parts are closely scaled. Tongue rather stout. Legs unarmed. (The neururation should be examined, but I have only two specimens and cannot now destroy either.)

The first and larger species is *Tripudia quadrifera*, the *Erastris quadrifera* of Zeller from Mazatlan, Mexico, represented by a single fresh specimen from Texas, received by me from Mr. Meske. This species is totally dark with a velvety patch on median space. On the hind wings both species beneath are distinctly marked.

Tripudia flavofasciata, n. s.

Very small, with a broad yellow band filling up the sub-basal space obliquely on primaries. Base of the wing blackish. Beyond the yellow band the wing is blackish with scattered pale or shining points, the ornamentation difficult to trace. The subterminal line is indicated very near the margin by pale festoons. Hind wings totally blackish as in *quadrifera*. Beneath the fore wings are blackish, with pale discolourous internal margin as in *quadrifera*. The hind wings show a discal spot ringed with pale and a pale subterminal line very near the margin. *Expanse* 7 mil. Demopolis, Alabama, collected by myself in the day time hovering over flowers, in the month of June.

In the ornamentation of *quadrifera* Prof. Zeller sees a resemblance to *Plusia*. Both species must be added to the "List of North American Noctuidæ."

Glaea carnosae.

The male of this species has the antennæ pectinate. A specimen has been sent me by Mr. Roland Thaxter, taken on Long Island. It will thus fall into a distinct section of the genus. We must also separate from the other species *tremula* and *pastillicans* (perhaps too closely allied to be distinct species) on account of the dorsal thoracic ridge of hair. According to a determination by Mr. Morrison, *venustula* is a synonym of *sericea*. I am still at a loss, however, to account for the statement that the claviform spot is marked in white. None of my specimens in this genus show any trace of the claviform spot.

Antaplaga, n. g.

Belongs to the series of Noctuid genera related to *Schinia* Hübn. The palpi are short; tongue moderate; antennæ simple. Legs slender; fore tibiæ with a long and rather large, pointed claw. Vestiture of the body and appendages consisting of flattened scales. Front with a naked protuberance, arising from a narrow rim which is exposed inferiorly; the

protuberance rises above, absorbing the rim, and its surface is irregularly roughened. The structure differs from *Fala*, in which a wedge-shaped protuberance arises from a cup; or from *Plagiomimicus*, which has the cup empty. The scaly vestiture and the shape of the wings are distinctive. These latter remind one of *Pippona*. The costal margin of primaries is long, external margin very oblique, apices produced, internal margin comparatively short.

Antaplaga dimidiata, n. s.

Head, thorax and basal third of fore wings white. Beyond, the wing is blackish brown, limited obliquely and a little unevenly from the white basal portion by the difference in color. A whitish subterminal shade. A discal mark obscurely indicated on the darker portion of the wing. Hind wings pale fuscous with white fringe; beneath whitish. Fore wings beneath fuscous. *Expanse* 30 mil. *Hab.* Colorado, Prof. Snow.

TINEINA FROM TEXAS.

(Continued from February No.)

BY V. T. CHAMBERS, COVINGTON, KY.

BLASTOBASIS.

My knowledge of this genus is derived wholly from Prof. Zeller's paper. It is equal in part at least to *Holocera* Clem. (I have to thank Prof. Riley for calling my attention to the fact that in some of my references to this genus the name is incorrectly given as *Holocera*.)

B. sciaphilella Zell., as described and figured, differs from *H. triangularella* Cham. as to the position, size and form of the triangular spots on the wings. *Sciaphilella* has distinct opposite, comparatively small costal and dorsal triangles, while *triangularella* has no dorsal triangle, but a single large costal one, wide upon the costa and crossing the fold, and it also has the apical part of the wing distinctly streaked and clouded with brownish gray. They do not seem to differ otherwise.

In a former paper I have referred to *H. glandulella* Riley some other Texas specimens differing slightly from typical bred specimens of *glandulella* and from Prof. Riley's description. The form described by Prof. Zeller as *B. nubilella* is one of these, and is, I think, only a variety of *glandulella*. Prof. Riley concurs with me in this, and he thinks *triangularella* and *sciaphilella* are also varieties of it. I am strongly inclined to concur with him. I have made some remarks on this subject in the former paper.

Argyresthia austerella Zell.

A. undulatella Cham.

I have never met with a specimen quite so strongly marked as that figured by Prof. Zeller, but I have elsewhere (*ante v. 6, p. 10*) remarked on the amount of variation in the intensity of the markings of the species. I have known it many years, and while I write (June 3rd, 1876) it swarms in hundreds around elm trees in this region. It is not improbable that the dark markings are deeper in more southern localities. Other species of *Argyresthia* have the habit of undulating or "see-sawing," but none that I have seen practice it to such an extent as this. Prof. Zeller first described it.

Actole bella Cham.

Before I saw Prof. Zeller's description of *Heliosella gracilis*, I thought it not improbable that it would prove to be this species, because of the resemblance in structure of the head and its appendages in the two genera and the fact that both were taken in the same locality, where *A. bella* seems to be not uncommon. They are, however, quite different creatures. *Actole* perhaps approaches *Helissines* as nearly as it does *Heliosella*. I have, however, no acquaintance with either genus other than through written accounts of them, having never seen a species of either. *A. bella* resembles *Chrysoclista lincella* in ornamentation more than it does any other species known to me.

COLEOPHORA.

C. bistrigella.

With fresher specimens before me, I amend the description of this species. Snowy white, in some lights silvery. The fore wings have two rather pale ochreous-yellow streaks from the base, one of which is above

the fold and goes to the tip, its basal half being margined above by a line of brown scales, and its apical part margined similarly towards the fold. The other streak is just within the dorsal margin, and goes to the dorsal ciliae. *Al. ex.* a little over $\frac{1}{2}$ inch.

LAVERNA.

L. anothercella Cham.

This is evidently the species which had been previously described as *Phyllocnistis magnatella* by Prof. Zeller, "*Bistrage*, &c., 1873," and I confess to feeling some surprise on finding it referred to *Phyllocnistis*, though after reflection I find the mistake in locating it there not so great as it at first appeared to be. Still I think it is more properly placed for the present in *Laverna* than in *Phyllocnistis*. I placed it with some hesitation in *Laverna*, and admit that it is not a true *Laverna*, and I think a new genus will ultimately be erected for it. Indeed, I at first prepared the diagnosis of such a genus, but finally considering the somewhat heterogenous character of the genus *Laverna*, I ultimately concluded not to separate it from that genus at present. It may be that I attribute too much importance to neurulation as affording generic characters; nevertheless, I think it probable that in the scarcity of specimens Prof. Zeller did not examine the neurulation of this species, or he would not have referred it to *Phyllocnistis*, and I feel still more confident that he would not have so done had he known the larva and its habits; while, on the other hand, I perhaps should not have been surprised to see it referred to *Phyllocnistis* had I not known its neurulation, and its larva and larval habits as given by Miss Murtfeldt in CAN. ENT., v. 7, p. 31. Like Prof. Zeller, I was struck by its resemblance in ornamentation to *Lyonetia*, so that my MSS. specific name, before I knew its larval habits, was *lyonetiella*.

My reasons for venturing to differ from Prof. Zeller as to its generic affinities are as follows: 1st Considering the minute size of all other known species of *Phyllocnistis*, and their close resemblance in ornamentation, the much greater size (nearly three times the *alar ex.* and nearly four times the weight) of this species and the difference in ornamentation (which, however, bears some resemblance to that of a *Phyllocnistis*), I should have suspected structural differences as great as those of size. 2nd —The characters drawn from the head and its appendages, while very nearly those of *Phyllocnistis*, do not differ in any important particular from those of some species of *Laverna* and of some other genera allied thereto;

greater differences, for instance, exist between the palpi of *L. langiella* and *L. lactiella* than are found between the latter and *magnatella* Zell. 3rd—The neuration of the wings places the species among *Elachistidæ* and not in *Lyonetidæ*. The neuration of the fore wings is exactly that of *Laverna Staintoni*, as figured *Ins. Brit.*, v. 3, except that in this species the apical branch of the median vein goes to the apex instead of to the dorsal margin before it. As in *Laverna*, the submedian is furcate at the base, which is not the case with *Phyllocnistis*; and though, owing to the peculiar ornamentation of the apex, the fore wings appear to be decidedly caudate, yet when denuded, they are found to be scarcely more so than in *Laverna atra* as figured *loc. cit.* The form of the hind wings is very nearly that of *L. epilobiella*, figured *loc. cit.*; and the neuration is identical with it except that the superior branch of the subcostal goes to the apex instead of to the costal margin just before it, and *the cell is indistinctly closed*. The fold and the dorsal vein are both distinct. In all these particulars it differs greatly from *Phyllocnistis* and agrees with several well recognized species of *Laverna* as well as, if not better, than they do with each other. 4th—The larval habits, as described by Miss Murtfeldt, *CAN. ENT.*, 7, p. 31, are those of several species of *Laverna*, but of no known species of *Phyllocnistis*, and the larva, while not closely resembling any *Laverna* larva known to me, is still more unlike that of *Phyllocnistis*, in fact, totally distinct from it, having sixteen feet. For these reasons I think its affinities are with *Laverna* and not with *Phyllocnistis*. The specific name *magnatella* Zell. has priority over *anotherwella*. *Magnatella* is very appropriate if the species belongs in *Phyllocnistis*, but not if it is a *Laverna*. I have never seen *L. cloisella* Clem., but I suspect that it will be found congeneric with this species.

I find that in the description of the species I have inadvertently omitted to mention the large tuft of raised scales margined behind with brown, and the short, longitudinal, black line behind it, situated within the margin at the base of the dorsal ciliæ, between the "two streaks which diverge from the small tuft within the dorsal margin before the ciliæ." See v. 7, p. 31.

L. unicristatella Chamb. previously described by Zeller as *L. definitella*.

DESCRIPTION OF A NEW LIMACODES.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Limacodes latomia, n. s.

This species is similarly sized with *y-inversa*, or perhaps a little larger. It is less brightly colored. The fore wings are dusky ochre with two blackish lines; the first crossing the wing a little obliquely at the middle; the second before the apex from costa to external margin. The lines do not meet at costa as in its ally. The space between the lines is *discolorous*, being somewhat grayish. Hind wings more yellowish, concolorous. Beneath immaculate, like hind wings above. Thorax like fore wings. Antennæ simple. Several specimens taken by Belfrage in Bosque Co., Texas; No. 572, May.

NOTES ON SOME SPECIES OF MELOE OCCURRING IN
TEMPERATE NORTH-EASTERN AMERICA.

BY F. B. CAULFEILD, MONTREAL, P. Q.

The life history of *Meloe*, as given by the Editor in the December No. of this journal, agreeing very closely with that of *M. angusticollis* Say, as far as my knowledge of its habits will permit me to judge, it occurred to me on reading Mr. Brodie's very interesting notes in the January No., that unless we have in this country a double brooded *Meloe*, some one must be referring another species to Say's *angusticollis*.

We have in temperate North-eastern America several species of *Meloe* closely resembling each other in general appearance, two of which are widely distributed, sometimes, probably often, occurring in the same localities, but I think at different seasons; the first, *M. angusticollis* Say, appearing early in May and disappearing before or about the middle of June; the other, *M. americanus* Leach, appearing in the latter end of July or beginning of August, and lasting until after the early frosts.

Having compared specimens of what I believed to be *angusticollis* with Say's description, I felt satisfied that I had that species, but I took *americanus* Leach to be *rugipennis* Lec., from having compared it with

specimens of *americanus* labeled *rugipennis*, in the collection of the Montreal Natural History Society, and from records of the capture of *rugipennis* in other localities at dates corresponding with the time of appearance of *americanus* here. However, as our *Meloes* resemble each other very closely, and as the description of *rugipennis* did not seem to suit the specimens labeled as that species, I did not feel justified in trusting to my own judgment in the matter, and sent a specimen of each species to Dr. LeConte, with the request that he would determine them for me. Having examined them, Dr. LeConte informed me that my determination of *angusticollis* was correct, and with his consent, I give the following corrected synonymy, which he very kindly sent to me :

“ 1. *M. ANGUSTICOLLIS* Say = *rugipennis* Lec.—Punctures of head and prothorax coarse and deep. This has been considered by some author, as = *VIOLACEOUS* Marsham. of Europe, but I have not compared them ; one specimen in my collection was thus labeled.

“ 2. *M. AMERICANUS* Leach—*angusticollis* Lec. Punctures very fine and prothorax still narrower.”

As Say's description of *angusticollis* is very good, I give it for the benefit of those who may not have access to the work in which it is given, viz., Jour. Acad. Nat. Sci., Phil., 3, 280 :

“ *Meloe angusticollis*. Thorax narrower than the head, elytra and abdomen violaceous. Inhabits Pennsylvania. Body dark violaceous, punctured ; head with profound punctures, an impressed, longitudinal, abbreviated, acute frontal line, and a transverse, elevated, obtuse one connecting the bases of the antennæ. Thorax slender, narrower than the head, profoundly punctured, widest rather before the middle, and narrowed at tip and base ; base emarginate and slightly margined. Elytra rugulose dark bluish-violaceous. Feet slightly hairy ; spines of the tibia and nails ferruginous. Abdomen slightly rugulose, dark greenish or violaceous ; tergum, each side black, opaque.”

M. americanus Leach is a smoother and more delicate looking insect than *angusticollis*, and the blue is inclined to shade into green in certain lights, especially on the head and thorax ; the punctures are so fine as to be almost invisible to the naked eye (in *angusticollis* the coarseness of the punctures give it a slightly roughened appearance). The acute, impressed frontal line, so characteristic of *angusticollis*, is wanting in *americanus*, and altogether it is a softer and more oily-looking insect.

M. angusticollis Say, makes its appearance here in the beginning of May, very soon after the snow has melted. I first observed it in 1872; I cannot now give the exact date, but it was early in May. I found three specimens on Montreal Mountain, one male and two females. Referring to my notes, I find the following dates for them in 1874: May 2nd, one specimen, Hochalaga, Montreal; May 13th, one specimen, Montreal Mountain; May 20th, eight specimens, Hochalaga, Montreal.

I did not observe them in 1875. On June 10th, 1876, the Montreal Natural History Society held their annual field day at St. Hillair, between twenty and thirty miles south of Montreal, and I was given a specimen of *Meloe* taken there on that day; unfortunately I did not preserve it, and cannot now be certain what species it was, but at the time I did not think it different from those I found in May, and as it was a female with the abdomen very large, I think it probable that it was the same.

I did not study their habits closely, as my spare time was chiefly devoted to Lepidoptera, but I only noticed them on warm, sunny days; I did not find any under stones, but I think it not unlikely that they may seek shelter under stones during wet or cold weather, as I have sometimes found to be the case with *Cicindela sexguttata*.

Mr. J. M. Jones, of Halifax, N. S., in a communication dated June 4th, 1871, CAN. ENT., vol. 3, p. 37, says: "*Meloe angusticollis* very abundant on Halifax common about the middle of May, now totally disappeared."

Mr. A. S. Ritchie, in his "List of Coleoptera taken on the Island of Montreal," records *M. angusticollis* Say, date of appearance not given; Coleoptera determined by Dr. Horn. This, I think, would be *M. americanus* Leach. In the same list Mr. Ritchie records *M. rugipennis* Lec. This, I think, would be *M. angusticollis* Say.

Mr. J. Pettit, in his "List of Coleoptera taken at Grimsby, Ont.," CAN-ENT., vol. 2, p. 132, records *M. angusticollis* Say. This is probably *M. americanus* Leach.

Mr. Wm. Couper, in his "List of Coleoptera taken at Quebec and other parts of Lower Canada," published at Quebec in 1864, records *M. angusticollis* Say as "common on potato-vines," no date given. As most of Mr. Couper's Coleoptera were named by Dr. LeConte, this also is probably *M. americanus* Leach.

I have no record of the capture of *M. americanus* Leach, myself, but

if I remember rightly, I took a *Meloe* rather late in the season, on Montreal Mountain, last summer. I thought at the time it was a soft, rich looking specimen, but I did not take a note of it. On reading Mr. Brodie's paper, I examined my specimens of *Meloe* carefully, and found a specimen of *M. americanus* Leach in a box of duplicate Coleoptera taken on the Island of Montreal, but at the time I did not know what it was. Having compared it with specimens labeled *rugipennis*, in the Montreal Natural History Society's collection, I found it to be the same; this specimen I afterwards sent to Dr. LeConte, who gave me the correct determination.

Mr. P. Kuetzing has kindly given me a pair of this species, taken by him in the latter end of July of last season (1876), in this neighborhood. This is the earliest record of the appearance of *americanus* known to me, but as Mr. Kuetzing only found the pair, and as the abdomen of the female is quite small, we may, I think, reasonably infer that they had just emerged, and were the pioneers of the August brood.

Mr. G. B. Pearson informs me that he has seen a species of *Meloe* common here during the latter part of summer, and noticed them late in October; doubtless the same species.

Mr. H. H. Lyman kindly lent me three specimens of *Meloe* for examination. One is *M. angusticollis* Say; the others are *M. americanus* Leach. Mr. Lyman informs me that the specimens of *americanus* were taken at Portland, Me., in August, 1873, but cannot tell when or where the other was taken. He says, however, that if it is *angusticollis*, it was probably taken at Montreal, as he never went down to Portland before the middle of July.

In a "List of Coleoptera found in the vicinity of Montreal," by W. S. M. D'Urban, Canadian Naturalist, vol. 4, p. 307, he records *rugipennis* Lec. as common. Mr. D'Urban states that nearly all the species were determined by Dr. LeConte.

In a "List of Coleoptera collected in the Valley of the River Rouge and neighboring Townships," by W. S. M. D'Urban, Geological Survey of Canada, report of progress for 1858, p. 226, he records *M. rugipennis* Lec., Hamilton's Farm, 31st August, and Grenville, 14th October.

In a List of Coleoptera collected on the south-east side of the St. Lawrence, from Quebec to Gaspé, and in the Counties of Rimouski, Gaspé and Bonaventure, by Mr. Robert Bell, jr., same report, p. 247, he records

M. rugipennis Lec. "between Metis and the mouth of the Matapedia." The date is not given, but as he records *Colias philodice* "between Metis and Lake Matapedia, August 17th," and as he did not arrive at Great Metis until August 14th, it must have been taken in that month or later. M. D'Urban, who drew up this list, states that Mr. Bell's Coleoptera were determined by Dr. LeConte.

I frankly confess that the records of Messrs. D'Urban and Bell puzzle me, for if the dates given by these gentlemen are correct, and if the specimens taken by them were determined by Dr. LeConte as *rugipennis* Lec., which is *angusticollis* Say, then that species must, I think, be double brooded. I believe, however, that if Dr. LeConte had seen specimens taken at those dates, he would have determined them as *M. angusticollis* Say, which would prove them to have been *americanus* Leach, when the dates would correspond with its time of appearance here, at Portland, and I believe, elsewhere. I am strengthened in this belief by the fact that specimens of *americanus* in the collection of the Montreal Natural History Society are labeled *rugipennis*, a mistake that Dr. LeConte would never have made.

I think Mr. Brodie's notes also point to the conclusion that *americanus* is the species found in autumn; this gentleman could give us important evidence in this matter by carefully comparing his specimens with Say's description, and letting us know which species they belong to. I do not think that any of our *Meloe*s are double brooded, but if Mr. Brodie's specimens are the true *angusticollis* of Say, it would seem as if such must be the case, as it seems improbable that a species would be taken in some places in spring, and in others in autumn, if it was not double brooded.

Dr. Packard, speaking of the larvæ of *Meloe* found by him in spring, says: "It is undoubtedly the young of our common *M. angusticollis* Say." If we substitute the name *americanus* Leach for *angusticollis* Say, this statement will, I think, be perfectly correct, unless the larvæ observed by Dr. Packard belong to one of our other species (I only know *angusticollis* and *americanus*).

M. angusticollis probably oviposits during the end of May and beginning of June, and by the end of June and during July we might, I think, expect to find the larva. These are, however, points that require careful investigation, as nothing short of rearing the perfect insect will enable us to identify the larva.

I will during the coming season, as far as my time will permit, endeavor to ascertain the dates of appearance, duration, &c., of these species in this locality, and I trust that Entomologists in other parts will do the same, so that the life history of our North American species may be worked up.

IMPORTANT NOTICE.

In consequence of the pressure of other engagements, our Secretary-Treasurer, Mr. J. H. McMechan, has found it necessary to resign his office. Until further notice, our correspondents will please address *all* communications to the Editor.

BOOK NOTICES.

Packard's Half Hours with Insects, Boston, published by Estes & Lauriat, 1877, 12 mo., pp. 384, illustrated, \$2.50, which was originally issued in twelve numbers, has lately been published in book form. We desire to correct some typographical and other errors of importance. Page 187, in explanation of Fig. 187, for Bucculating read Bucculatrix; page 289, line 23, for *Disippus* read *Archippus*, and in line 25, for *Archippus* read *Disippus*; page 305, line 13, for sumac read cottonwood, and on page 306, in explanation of Fig. 236, for sumac gall read vagabond gall.

We cheerfully commend this useful work to our readers.

Report upon the Orthoptera collected by the Wheeler Expedition, by Samuel H. Scudder; 8vo., 17 p. In this paper the author gives much valuable information in relation to the Orthoptera occurring on the eastern slope of the Rocky Mountains; 17 new species are described, and definitions of 8 new genera given. Report of the Hayden Expedition, from the Department of the Interior, containing Brief Synopsis of North American Ear-wigs, with an appendix of the fossil species; 8vo., 12 p. List of Orthoptera collected by Dr. A. S. Packard in Colorado, &c., during 1875; 8vo., 7 p. Notice of a small collection of Butterflies made by Dr. Packard in Colorado and Utah. All by Samuel H. Scudder. We tender our best thanks to the author for copies of these papers.

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THE

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The Canadian Entomologist.

VOL. IX.

LONDON, ONT., MAY, 1877.

No. 5

THE UNITED STATES ENTOMOLOGICAL COMMISSION.

The enormous losses occurring yearly to agriculture in America from destructive insects are gradually awakening public attention in this direction, and also to the necessity of careful observations on the habits of these pests, with a view to their destruction or limitation. We were much gratified to learn that the late Congress of the United States, recognizing the importance of this subject, made a liberal appropriation to provide for the appointment of a commission of practical Entomologists to investigate and study the habits and life history of these insect pests, and thoroughly test such measures as have been or may be suggested with the view of lessening their ravages, the investigations to be carried on for several consecutive years. The Government has been particularly fortunate in securing the services of three eminently practical Entomologists to undertake this work, Prof. Riley, State Entomologist of Missouri, Dr. A. S. Packard, of Salem, Mass., and Prof. C. Thomas, State Entomologist of Illinois; Prof. Riley has been designated chief, Dr. Packard secretary, and Prof. Thomas disbursing agent. While the destructive Rocky Mountain Locust, *Caloptenus spretus*, will specially engage the attention of the Commission during this year, careful observations will at the same time be made on other destructive pests. We desire to call particular attention to Dr. Packard's request in this present issue for specimens in all stages of the Hessian Fly, Joint Worm and Wheat Midge, and trust that all our members will endeavor to aid the Commission in their labors in every possible way.

The headquarters of the Commission will be at St. Louis, Mo.; there will also be an office, with a clerk to attend to certain routine business, at the rooms of the Geological and Geographical Survey of the Territories, at Washington, D. C., Dr. F. V. Hayden in charge.

The locust area assigned to each Commissioner the present year is as follows :—

1. Prof. Riley takes for his field the region east of the mountains and south of the 40th parallel, the west half of Iowa, and, conjointly with Dr. Packard, British America west of the 94th meridian, where the principal source of the devastating swarms will probably be found.

2. Dr. Packard will take for his field West Wyoming, Montana, Utah, Idaho, and the Pacific Coast.

3. Prof. Thomas takes all the region east of the mountains not enumerated, including Nebraska, Minnesota, etc.

The publications will consist of circulars, bulletins, memoirs, and the annual report of doings and results of the work of the Commission.

To Prof. Riley are assigned more particularly the following divisions of the subject : Biology, or Natural History ; Insect Enemies and Parasites ; Remedies and Devices for Destruction.

To Dr. Packard : Anatomy and Embryology.

To Dr. Packard and Prof. Thomas, conjointly : Meteorological Bearings and Migrations.

To Prof. Thomas : Geographical Distribution, Enemies not Entomological, Agricultural Bearings of the Subject.

The Commission expects to secure co-operation with the United States Signal Bureau in affording meteorological data in connection with a study of the migrations of the locust ; also, hopes to secure the aid of the Canadian Government in co-operating with it in its investigations in British America.

It is the determination of the Commission to confine its operations more particularly to the practical bearings of the subject, with a view to ascertain all possible remedies against these destructive insects. All else will be made subservient to the great object for which the appropriation was made, to wit :—

1. The best means of fighting the plague as it occurs in the States to which it migrates, but in which it is not indigenous.

2. The thorough investigation into its habits in its native home, with a view of preventing, if possible, its migrations therefrom.

The following are the topics on which data are requested from observers in all parts in reference to the destructive locust :—

1. Date, and time of day of the arrival of swarms.
 - 1*a*. Direction and force of the wind at the time.
 - 1*b*. Temperature and character of the weather at the time (clear or cloudy).
 - 1*c*. Direction of the flight, density, height and extent of the swarms.
2. Date and time of day of the departure of swarms.
 - 2*a*. Direction and force of the wind at the time.
 - 2*b*. Temperature and character of the weather at the time.
 - 2*c*. Direction of the flight, density and extent of the swarms.
3. Date when the first eggs, if any, were deposited the present year.
4. Date when the eggs were most numerously hatching the present year.
5. Date when the eggs were most numerously hatching in previous years.
6. Proportion of eggs that failed to hatch the present year, and probable causes of such failure.
7. Nature of the soil and situations in which the eggs were most largely deposited.
8. Nature of the soil and situations in which the young were most numerously hatched.
9. Date at which the first insect acquired full wings.
10. Date when the winged insects first began to migrate.
11. Estimate the injury done in your County and State.
12. Crops which suffered most.
13. Crops most easily protected.
14. Crops which suffered least.
15. The prevailing direction in which the young insects travelled, and any other facts in relation to the marching of the young.
16. The means employed in your section for the destruction of the unfledged insects, or to protect crops from their ravages, and how far these have proved satisfactory.
17. The means employed in your section for the destruction of the winged insects, or to protect crops from their ravages, and how far these have proved satisfactory.

18. Descriptions, and if possible, figures of such mechanical contrivances as have proved useful in your locality for the destruction of either the young or the winged insects.

19. If your section was not visited in 1876, please state this fact.

20. If visited any previous year, please give the dates.

21. To what extent have birds, domestic fowls, and other animals, domestic or wild, been useful in destroying these insects?

As the successful prosecution of this work is as deeply important to the western portions of our Dominion (where immense damage is often inflicted by this destructive foe) as to any part of the United States, it is hoped that our Government will render all possible aid to the work of this Commission, either by instructions to parties engaged in surveys and other Government work in the western regions, to make the necessary observations, or otherwise by appointing suitable co-operating agencies to aid in the work.

NOTES AND DESCRIPTIONS OF NEW MOTHS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Every student knows how much depends on the careful handling and perfect condition of specimens of moths for the cabinet. Especially in the *Noctuæ*, where the scale tufts on the body are used for generic characters, is it necessary to have well preserved material in order to give a definite determination. In this respect the collections of Prof. Lintner, Mr. Hill, Dr. Bailey and (though last by no means least) Mr. Otto Von Meske are to be very highly praised. The students of Albany have shown themselves excellent collectors, and it is a great pleasure to examine their specimens. I do not say that Mr. Von Meske's collection is the best in the country in this respect, but I do say that it is the best I have yet seen. Sugaring for *Noctuæ* in April and May has been found very remunerative in the vicinity of Albany. Beautiful specimens of *Lithophan pexata*, *fagina*, *Bethunci*, *disposita*, *tepidæ* and *Thaxteri* have been taken in

this way. Dr. Bailey has captured in this manner *Scopelosoma devia*, *Graefiana*, and *tristigmata*; also *Morrisonia vomerina* and *evicta*. Species of the genus *Homoptera* have also occurred not unfrequently; among these I may mention *unilineata*, a species easily recognized by its strongly dentate pale brown wings, the exterior line deep brown on primaries, blackish on secondaries. It is to be hoped that this method of capturing moths will be more extensively used; it will infallibly reveal unexpected varieties in every neighborhood.

Dasychira Lintneri, n. s.

♂. Dark gray, shaded with ochrey at the base of primaries, on the median space and along subterminal line. Basal line dark, narrow, dentate on costa, slightly outwardly projected below median vein. Extra basal space wide. Interior line very distinct, perpendicular, black, toothed on subcostal vein, thence inwardly excavate to median vein at the point of origin of vein 2, thence again excavate to vein 1, diffuse on the margin. Exterior line faint, with whitish included shade. Subterminal line irregular. Fringes blackish, white externally and interrupted with white. Hind wings gray with a mesial shade line followed by whitish and shaded with blackish on external margin at anal angle, where the commencement of a second outer line is indicated; fringe as on fore wings. Body stone gray; antennæ with lengthy pectinations. Beneath the wings are paler; hind wings whitish with a sinuate blackish mesial common line. Body paler beneath. Expanse 40 mil. Centre, N. Y., in May, several specimens in the collections of the State Museum, Mr. Hill and Dr. Bailey.

Euchaetes Spraguei Grote.

The female of this fine species is contained in Mr. Von Meske's collection from Texas. The stripes on costa and internal margin are paler than in the male.

Euclea incisa Harvey.

The female is in Mr. Meske's collection from Texas. The hind wings are paler, more yellowish than in *paenulata*, there is no red stain at the angulation of the green space near internal margin on primaries, the angulation is not so deep and the terminal brown space is narrower. I regard the two as different species. Both forms are in the collection of the Buffalo Society of Natural Sciences and of Mr. Von Meske.

Lithophane Baileyi, n. s.

♂ ♀. Greenish gray and resembling at first sight *querquera* from its color, but with the usual markings of the genus distinct, and with narrower wings. Fore wings rather dark greenish gray. Basal dash black, surmounted by the usual pale shade. T. a. line double. Orbicular concolorous. Reniform large, rounded, with a remarkably bright red stain and shaded with blackish. Median shade blackish, diffuse between the spots. T. p. line double, denticulate, a little more outwardly exerted than in *querquera*, opposite the cell. Subterminal line more or less evident by its fuscous preceding shade. Terminal line black, sub-continuous. Hind wings fuscous with dark fringes. Beneath fuscous with a ruddy hue, a common line and discal spots. Expanse 36 mil. Two specimens taken near Albany in September, by Mr. Geo. J. Bailey, for whom the species is named. One male also from Canada.

This species differs from *querquera* by the narrower wings, with the costal angulation more pronounced, the more grayish color, the scalloped terminal line, less deeply waved subterminal, and the distinct median lines; the secondaries and their fringes are not reddish above.

Apateia (Acronycta) falcula, n. s.

♀. Allied to *tritona* and *grisca*. The external margin is sinuate, not straight, sweeping inwardly below the apices and bulging opposite the median nervules. Fore wings dark purple gray, very like *tritona*. A black basal dash lined above with pale, furcate. Internal margin at base with a patch of light brown scales. Ordinary spots concolorous, faintly outlined, orbicular larger than in *tritona*. Median shade obsolete; median space very wide. T. a. line evident above the basal dash (which slightly exceeds the line) and here blackish; beneath the dash obsolete. T. p. line shaped as in *tritona*, but without the discal incision, blackish, sub-dentate, edged outwardly with brown, inwardly with whitish. Black dash on sub-median fold not extending within the line. Hind wings whitish at base, outwardly vaguely and largely blackish. Fore wings beneath fuscous; hind wings whitish with a faint discal spot and external sinuate macular band. Thorax like fore wings, edged on the sides and behind with light brown. Body beneath whitish; abdomen above light gray. Expanse 35 mil. Illinois, Mr. Thos. E. Bean.

This form differs from its allies in the shape of the external margin of

primaries, the bright brown edging to the thorax, and in the details of the ornamentation throughout.

Mamestra Beanii, n. s.

♂. Allied to *purpurissata* in color, but not quite so large, about the size of *grandis*. Body tufts improminent. Eyes hairy. Antennæ with a white dot at base, simple, ciliate; in *purpurissata* they are serrate and bristled. Purple gray brown, darker than *purpurissata*, median space tinged with reddish. Ornamentation not distinct. Ordinary lines double, lunulate or waved; t. a. line with its outer line more distinct and blackish. Claviform small, black-edged. Orbicular large, paler than the wing. Reniform rather narrow, with an internal shaded ring, stained with ochrey red. T. p. line not much indented below the median vein. Sub-terminal line continuous, nearly even, with a notch on the interspace between veins 3 and 4, indicating the usual W-mark. Apices with a whitish shade. Fringes concolorous. Hind wings dark fuscous with whitish fringe. Beneath paler, fuscous, with the costal and terminal spaces powdered with gray, reddish or purplish. Double exterior common shade lines and faint discal dots. Expanse 45 mil.

I name this fine species for its discoverer, who has collected some rare moths with the present species at Galena, Illinois. Mr. Bean has taken there *Calymnia calami* Harvey, previously only known from Texas; also *Lithophane semiusta*, *Scopelosoma tristigmata*, *devia* and *Pettiti*.

Gortyna rigida Grote.

♂ ♀. I have alluded to this species in the Proceedings of the Ent. Soc. of Phil., 4, 324, as being allied to *cataphracta*, and differing chiefly in the straight transverse posterior line, much as *purpurifascia* differs from *rutila*. It is paler yellow than *cataphracta*, with less purple and dark shades. The stigmata are concolorous. The base of primaries is pale; there is a faint terminal purplish washing in the male. My female specimen does not show but very faint traces of it. The moth is a little slighter than its ally, and can be quickly known by the rigid purple t. p. line not bent opposite the disc as it is in *cataphracta*. ♂ Penn.; ♀ Illinois (Mr. Bean).

The following species is the first Eastern representative of the genus *Ochria*, which contains the European *flavago* and the Californian *sanzalite*.

Ochria Buffaloensis, n. s.

♀. The clypeus has a frontal horn, else the insect looks like *Gortyna rutila* and allies. The primaries are brownish red with the extra-basal and subterminal spaces washed with purple. T. a. line geminate, waved, with rather a deep sinus on vein 1, its inner line purple, its outer dark brown red. Orbicular spherical, yellow white. The accessory spots are totally wanting; this last superficial character will separate the moth from any N. Am. species of *Gortyna* allied to *rutila*, known to me or described by Gueneé. Reniform moderate, yellowish, interlaced with a double brown curved line. T. p. line double, nearly straight, not exerted opposite the cell, but prolonged on costa as in *purpurifascia*; its outer line is dark purplish, more diffuse. S. t. line dark, distinct, irregularly dentate. External margin even, bulging opposite median nervules. Veins obscurely purplish. Hind wings pale red, with a mesial straight dark line. Beneath light purple red, with a distinct common line; on hind wings a narrow lunule. Body beneath concolorous with wings; thorax above darker, more purplish. Expanse 40 mil. Miss Mary Walker, Buffalo.

Polia pallifera, n. s.

♀. This species resembles Herrich-Schaeffer's figures of *platinea*. Fore wings whitish gray with the median space washed with olivaceous beyond the olive median shade line. Claviform olivaceous, very large, finely lined with black. Reniform and orbicular gray, shaded with olive, the former white narrowly margined with black. Median lines geminate, of the usual shape. Beyond the t. p. line the wing is whitish gray, cut by the olivaceous shaded s. t. line. Fringes obscure with an interrupted dark line. Hind wings fuscous, paler at base with a sinuate mesial line and a pale subterminal shade. Beneath dirty whitish with double lines and discal marks. Body beneath and abdomen obscure whitish or dusty gray; thorax more purely gray. Expanse 42 mil. Illinois, Mr. Bean.

I cannot identify this with any of Mr. Morrison's descriptions under this genus. It has the fascies of European species of the group. It recalls the Californian *Dian. insolens*, but the eyes are naked.

Homoptera Woodii, n. s.

♂. This species is more strigate than any other known to me. Collar brown with a black mesial line, tipped with gray. Wings dentate, covered with dark strigae. Base of primaries blackish, defined by a broad velvety

black bent interior line. Orbicular wanting. Median space pale anteriorly, blackish posteriorly, where this last color includes the narrow pale reniform with its distinct central black streak, and extends beyond the line narrowly and over costal region to apices. T. p. line fine, black, even, undulate, bent inwards opposite the cell in the centre of its superior exerted portion. Subterminal line defined by the margin of the blackish mesial shading, excavate opposite the cell and more widely so inferiorly. Terminal space pale like the anterior half of median, showing the strigae very plainly. Hind wings pale fuscous, covered with dark strigae, with a more or less determinate mesial line, beyond which the wing is paler. Beneath pale fuscous, strigose; the discal mark indicated on primaries, as also a common mesial line. Expanse 38-40 mil. Several specimens taken at Centre, N. Y., by Dr. J. S. Bailey, and his assistant, Mr. W. C. Wood, of Wayne Co., N. Y., for whom the species is named.

The Albany collectors are studying this difficult genus, and Mr. Hill has called my attention to the fact that *edusa* and *lunata* are possibly sexes of one species.

I am indebted to Mr. Bean for an Illinois specimen of *Homoptera penna* Morrison.

Endropia homuraria G. & R., Tr. Am. Ent. Soc., ii., 80.

Dr. Packard gives this as a synonym of *duaria*, but erroneously. A comparison of our description shows that it applies to a form with "the angles of the external margins of the wings more determinate" than *hypochraria*. Now *duaria* has the external margins rounded. *E. homuraria* is more intensely colored than its allies: beneath it is "intense deep orange, the common line followed externally by a bright purplish shade." The species is well described and cannot be mistaken for *duaria*. It is very near to *hypochraria*; the median lines are angulated as in that species. The discal sinus of the exterior line on the wings above seems to be shallower in *homuraria*, of which I have seen no female specimens as yet.

Lozogramma lactispargaria.

Cidaria lactispargaria Walk., Can. & Geol., 6, 41.

Tephrosia disconventa Walk., C. B. M., 21, 404.

Lozogramma disconventa Pack., 243, pl. 9, fig. 56. Albany (Lintner); Quebec (Belanger).

These different names refer to the same species. The wings are scalloped, not entire, and I accept Dr. Packard's generic determination with hesitation.

Tornos infumataria, n. s.

♀. Larger and stouter than *robiginosaria*, with the wings more elongate. Entirely smoky blackish. Fore wings with two sub parallel, oblique, irregular, black median lines, the exterior partly lined on the outside with whitish, but very faintly so. Hind wings with an indistinct mesial line, which is seen to be scalloped in the best marked specimens; beneath without markings. This concolorous species differs from its ally by the course of the waved median lines on primaries. Expanse 30 mil. June 3, 5; Texas (Belfrage, No. 604).

Aspilates pervaria var. *interminaria* Grote.

♂ ♀. Both sexes of this form, which is smaller than the type and differs at once by the absence of the lines on primaries, have been collected by Mr. Belfrage in Texas (male, June 5, No. 602; female, May 22, No. 653). It is paler than the type and looks like a different species.

LIST OF BOMBYCIDÆ OCCURRING ON THE ISLAND OF
MONTREAL, P. Q.

BY F. B. CAULFEILD AND C. W. PEARSON, MONTREAL, P. Q.

BOMBYCIDÆ.

Lithosiinæ.

Hypoprepia fucosa Hübn. Not common.

Euphanessa mendica Pack. Common; end of June, July.

Crocota Treatii Grote. Very rare; C. W. P.

“ *aurantiaca* Hübn. Very rare; C. W. P.

“ *brevicornis* Walk. Rare.

Utetheisa bella Linn. Rare.

Arctiinæ.

Callimorpha lecontei Boisd. Common; end of June, July.

- Platartia parthenos* Harris. Very rare ; at light, 26th June, C. W. P.
Euprepia americana Harris. Not uncommon ; end of July, August.
Arctia virgo Harris. Rare.
Arctia Saundersii Grote. Not common ; July and August.
 " *nais* Hübn. Very rare.
 " *virguncula* Kirby. Very rare ; June, C. W. P.
Pyrharcia isabella Abbott & Smith. Exceedingly common ; June, July.
Phragmatobia rubricosa Harris. Rare ; July, 1876 ; May 12th, 1877.
Leucartia acraea Drury. Common ; June, July, August.
Spilosoma virginica Fabr. Very common ; June, July, August.
Hyphantria textor Harris. Common ; June, July.
Euchaetes egle Drury. Very rare : bred from larva found on Burdock.
 C. W. P.

" *collaris* Fitch. Not uncommon. June and beginning of July.

" *Oregonensis* Streck. Rare ; June.

Halesidota tessellaris Smith. Not common ; July, frequents blossoms of
Asclepias cornuti at twilight.

" *caryae* Harris. Common ; June.

" *maculata* Harris. Rare ; June.

Dasychirinae.

Orgyia nova Fitch. Not common ; end of July, August.

" *leucostigma* Harris. Very common ; July and August.

Parorgyia parallela G. & R. Very rare ; Mr. Kuetzing.

Cochlidiinae.

Euclea querceti Pack. Rare ; Mr. Lyman.

Limacodes y-inversa Pack. ? Rare ; Mr. Kuetzing.

Ptilodontinae.

Datana ministra Drury. Not uncommon ; July.

" *Angusii* G. & R. Rare ; July, Mr. Hibbins.

Notodonta stragula Grote. Rare ; Mr. Hibbins.

Lophodonta ferruginea Pack. Rare ; C. W. P.

Pheosia rimosa Pack. Rare ; taken by Mr. Lyman.

Nerice bidentata Walk. Rare ; Mr. Kuetzing.

Edema albifrons Smith. Not uncommon ; June.

Cedemasia concinna Smith. Larvae, August ; rare.

Coelodasys unicornis Smith. Not common ; July.

" *cinerofrons* Pack. Rare ; Mr. Kuetzing.

Coelodasys biguttatus Pack. Rare ; Mr. Kuetzing.

Heterocampa manteo Walk. Not common ; June.

Cerura cinerea Walk. Rare ; June, C. W. P.

“ ——— Undetermined. Not common ; June.

Platypteryginæ.

Platypteryx arcuata Walk. Rare.

“ *lacertinaria* Linn. Rare.

Attacinæ.

Telea polyphemus Linn. Very common, June, July.

Actias luna Linn. Not common ; June.

Callosamia promethea Drury. Rare ; June.

Samia cecropia Linn. Common ; June.

“ *columbia* Smith. Very rare ; one specimen from cocoon found on maple, emerged in-doors May 15th, 1874 ; C. W. P.

Ceratocampinæ.

Hyperchiria io Fabr. Not common ; June.

Dryocampinæ.

Dryocampa rubicunda Fabr. Very rare ; Mr. Lyman.

Lacheiinae.

Gastropacha americana Harris. Very rare ; June 10th, C. W. P.

Tolyte velleda Stoll. Not common ; September.

“ *laricis* Fitch. Very rare ; Mr. Bowles.

Clisiocampa americana Harris. Very common ; July.

“ *sylvatica* Harris. Extremely abundant ; July.

Hepialinæ.

Xyleutes robinae Harris. Not common ; June.

Stenopis argentimaculata Harris. Very rare ; July, F. B. C.

“ *thule* Strecker. Very rare, F. B. C.

REMARKS ON THE SYNONYMY OF NORTH AMERICAN COLEOPTERA.

BY E. P. AUSTIN, CAMBRIDGE, MASS.

Tachinus fumipennis Say (*Tachyporus*) is not synonymous with *T. axillaris* Fr., as supposed by Erichson, but differs from that species in several important particulars, as follows :

In *T. axillaris* the upper surface is extremely finely punctured, while

in *fumipennis* the elytra particularly have the punctuation much more distinct; but the sexual characters will enable the two species to be more readily separated. In *T. axillaris* the males have the fourth abdominal ventral segment triangularly impressed; the fifth is broadly impressed, with the apex deeply emarginate. In my specimen there is also a slight impression on the tip of the third segment, which is not mentioned in the description of Erichson. The sixth segment is terminated by two long, somewhat curved spines. The males of *T. fumipennis* have the third and fourth segments not impressed: the fifth is broadly impressed, with the apex only slightly emarginate and the terminal spines of the last segment are less prominent.

The female of *fumipennis* differs from that of *axillaris* as described by Erichson (I have seen no females of the latter species) by having the two external laciniae of the last segment of the abdomen longer and more slender than the intermediate ones.

Tachinus colonus Sachse, from the Southern States, differs by the description from either of the above species, and will probably prove to be distinct. Besides the above, there is at least one, probably two, species as yet undescribed, agreeing in general appearance with these, and which would be confounded with them on a superficial examination.

As the description of Say will apply to all of these species, it is somewhat doubtful which is the one really intended by him: in fact, it is quite possible that he has confounded two or more species under the name of *fumipennis*, but the species which I have characterized under that name is apparently the most abundant in Pennsylvania, whence Say's specimens came. The description of Say reads "body minutely punctured," a phrase which is not used in the description of several allied species published at the same time, from which it is probable that the species intended by him was more coarsely punctured than the others, which also points to this species rather than either of the others mentioned above.

Languria inornata Rand., *gracilis* Newm. This species has been unfortunate in names; originally described by Latreille as *L. "bicolor* Fabr.," the name was changed by LeConte to *Latreillii*, and by Crotch to *gracilis* Newm., and *inornata* Rand. placed as a variety: but it appears that the description of Randall has priority over that of Newman, and the species should therefore bear the name *inornata* Rand.

Hispa collaris Say, Jour. Ac. Phil., iii., 433, is without doubt the

species described as *Odontota Walshii* Crotch, Pr. Ac. Phil., 1873, 81, and the species should therefore be called *Odontota collaris* (Say).

Imatidium 17-punctatum Say, l. c. 435, is not a synonym of *Chelymorpha cribraria* Fabr., as stated by LeConte, Say's Writings, ii, 207, but is the species subsequently described by Crotch, l. c. 77, as *Ch. Lewisii*, which will therefore have to be considered a synonym.

Graptozona plicipennis Mannh. = *Haltica bimarginata* Say; the description of Say has priority.

Leptura sphaericollis Say, Jour. Ac. Phil., v., 280 = *ruficollis* Say, l. c. iii., 421. Dr. LeConte has already noted, New Series Am. Col., pt. ii., 222, that the species are identical, but not that *ruficollis* has priority.

ON SPECIES OF MELIPOTIS.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

I propose to designate by the varietal name *versabilis*, that form of *jucunda* in which the primaries are nearly unicolorously fuscous gray without the white shading on the median space, and without the contrasting black and white of the usual and typical form. Specimens of this are in the collection of the Buffalo Society of Natural Sciences, collected by Mr. Grote in Alabama. Where the t. p. line is at all discernible, it is seen to make the same sharp indentation below the median vein as in the type. The species described by me from Texas under the name *agrotipennis* may be distinguished by the t. p. line not running in so far at this point and making an obtuse instead of a pointed angle on vein 2.

Melipotis sinhalis, n. s.

♀. Belongs to the group of *jucunda*, but is larger, with the fore wings more pointed. Whitish gray; fore wings crossed by interrupted lines. T. p. line well toward the outer edge, partially obliterate and forming a distinct black sinuate streak from vein 3 (where it approximates to the margin) to vein 1 inwardly. A terminal waved line. Discal mark obliterate, faintly yellowish. Hind wings pure glistening white, with a deep black border discontinued below vein 2. A black dot on the

submedian fold at its outer extremity. Fringes white notched with black opposite the median nervules. Body gray; tegulae lined within with black. Beneath white with broad black margin to the wings, discontinued below on secondaries; a black discal streak on fore wings. Palpi gray; second joint marked outwardly with fuscous.

Expanse 48 m. m. Aug. 6, Belfrage; No. 646, Bosque Co., Texas. Quite distinct in ornamentation and color from any species known to me.

ON AN AMERICAN SPECIES OF LOPHOPTERYX.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Among the more interesting European *Ptilodontid* genera not yet recognized as American (the species referred by Walker to *Stauropus* do not, according to Grote, belong to that genus) is Stephens' genus *Lophopteryx*, as restricted by Lederer. To this I would refer a species found by Mr. C. A. Blake in New Jersey, near Philadelphia, and which I do not find elsewhere described.

Lophopteryx americana, n. s.

♂. Eyes hairy; antennae short, with long pencils of bristly hair from each joint. Primaries with uneven external margin. Bright brown in color, allied to *camolina*, but less rusty or reddish. Nervules interruptedly marked in very dark brown. Transverse anterior line single, forming two approximate obtuse teeth on the cell, dentate below median vein. Transverse posterior line double, obliterate, with included paler shade which traverses the wing obliquely, marked on costal region; a series of ante-apical pale dots; a purplish brown subterminal shade. Median space diffused, shaded with purplish brown, more apparently so before the outer line and inferiorly where the median lines approximate; a terminal brown line, interrupted on the veins, opposite to the extremities of which the exerted fringe is dark brown. Hind wings ochrey, with concolorous fringes becoming brown toward anal angle; a median pale shade, which intersects at internal margin a blackish patch. Beneath yellowish immaculate, the dots on costa of primaries before apices

repeated ; fringes brown. Body rusty brown. Tooth on internal margin of primaries not prominent. Expanse 36 m. m. Collection Buff. Soc. Nat. Sci.

This seems to be a shorter and broader-winged form than the European, in which it would conform to Dr. Speyer's law of variation in the Nocturæ. The outer line is less distinct than in the European species, of which it may be a modification.

ON PSEUDOHAZIS HERA (HARRIS).

BY A. R. GROTE, BUFFALO, N. Y.

Through the kindness of Lieut. Carpenter, I have received from Yellowstone Park a ♂ specimen which agrees with Mr. Walker's description of *pica* (B. M. Lists, 1318), and must be the same, although outside of the common black outer fascia the wings are tinted with yellow, while appearing white at first glance. But Walker's description seems identical with Harris' *Hera*, and his specimen is from Doubleday also. Probably the *same* specimen has been made the type of both species. Walker's locality, "United States," is indefinite, and probably not as originally given by Doubleday. Further comparisons are needed to settle the differences between *eglanterina* and *Hera*, which I have considered (Am. Phil. Soc., 1874, p. 4) as specifically identical.

It is not necessary, at this time, to analyse Audubon's plate ; for the two names, *Hera* and *pica*, are founded on *specimens*, and no name is attached by Audubon or others to the original figures. I would correct the synonymy of the two forms as previously given by me.

Pseudohazis G. & R. (1866).

(Type : *Saturnia eglanterina* Boisd.)

1. *Pseudohazis Hera* (Harris) G. & R., Ann. Lyc. N. Hist., N. Y., 8, 377 ; *Saturnia Hera*, Rep. Ins. Mass., 286, 1841 ; *Hemiluca pica* Walk., B. M. Lists, 6, 138.

Hab. Rocky Mountain Region.

2. *Pseudohazis eglanterina* (Boisd.) G. & R., Ann. Lyc. N. Hist., N. Y., 8, 377 ; *Saturnia eglanterina* Boisd., Ann. Soc. Ent. Fr., 2nd Ser., x, 323 ; *Telea eglanterina* H.-S., Exot. 60, fig. 445.

Hab. California.

CATALOGUE OF THE LEPIDOPTERA OF AMERICA NORTH
OF MEXICO.

Part I—Diurnals ; by W. H. Edwards.

Published by the American Entomological Society, Philadelphia, 8vo., pp. 68. Price, \$1 ; interleaved for additions, \$1.30.

This work of Mr. Edwards' is conservative in its character, and as such is most refreshing ; after having tried in vain to fathom the innovations with which we have for the past few years been perplexed, this excellent catalogue comes to our rescue, and will, we feel sure, be appreciated by all who do not believe in the excessive multiplication of genera and their establishment on minute and often variable characters. Here the dear old familiar names are nearly all in their places again, and we go back to the time-honored method of heading our collections with *Papilio*, and embracing in it some 22 species. For ourselves, we have for some time past been literally at sea in reference to names for butterflies, wandering about without chart or compass to direct us ; we scarcely knew the name of any species, and didn't expect ever to have the time or disposition to master the new names proposed, and hence we have been so discouraged that we have done really nothing to our collection of butterflies for a long time past. We are not disposed to object to changes in nomenclature where it can be made to appear that a *necessity* for such modifications exists, but we have been unable to see any good reason for adopting the wholesale changes which have been proposed, and we believe that the great bulk of working Entomologists hold the same view. With a catalogue now more to our mind, sufficiently progressive, and, at the same time, a most convenient help, we shall be able to classify our species under genera we can comprehend, and go to work with a will again.

In the general arrangement the author, while adopting and incorporating some of the work of later systematists, adheres mainly to the order of Doubleday and his associates in the "Genera of Diurnal Lepidoptera," and where the genera have numerous species, as in *Colias*, *Argynnis*, *Thecla*, *Lycaena*, *Pamphila*, &c., they are for the sake of convenience divided into sections. In crediting genera the author strictly follows the rules adopted by American Entomologists at the recent meeting in Buffalo, and appends the name of the party who first gave the genus a proper definition. For this reason Hübner's genera are excluded

and two of the genera made by Mr. Scudder in the Hesperidæ, *Amblyscirtes* and *Pholiosora*, have been credited to Dr. Speyer because his definition of them is the first published. With regard to Mr. Scudder's genera, we think he should have had credit for them. We all know what pains-taking and unsparing effort he has bestowed in laboring to introduce what he conscientiously believes to be needed reforms in Entomological nomenclature, and although the present generation of Entomologists is not disposed to adopt such wholesale reform as he proposes, he is undoubtedly *deserving of full credit* for any of his material which may be used. His work on New England Butterflies, in which all these genera are minutely defined, has long been written, but its expensive character has been an obstacle in the way of its publication. Under these circumstances, *which are very exceptional*, we regret that Dr. Speyer's references of these genera to Scudder have not been followed.

There are 506 species enumerated in this list, embraced in 64 genera. There are also references by the use of a system of special signs to all writers who have treated of the preparatory stages of our butterflies, no matter how briefly; we regard this as an excellent and valuable feature in the work. The catalogue is in every way well got up, and we hope all our readers will procure a copy of it, and if, after they have given it a careful perusal, they think as well of it as we do, they will set to work and arrange their collections in accordance with it, feeling profoundly thankful to the author for the timely relief he has afforded.

NEW SPECIES OF NOCTUIDÆ.

BY W. V. ANDREWS, BROOKLYN, N. Y.

Acronycta Walkeri, n. s.

F. W., upper side—Wing-stretch,* 1.5 in. General color brownish gray. The costal edge has ten small, dark brown, irregular marks, and

* Perhaps I ought to apologize for coining a word in the above description—"wing-stretch." I hold it, however, to be a legitimately formed word, and I believe that in giving a description in English no foreign word or abbreviation should be used, if an English word, with the same meaning, can be found or formed.

four of these, those nearest the base of wing, are nearly enclosed by a dark brown, semi-circular line, which also encloses a basal patch, not distinct in color from the rest of the wing. Fringe of the wing light gray. A row of seven or eight dark brown, oblong spots on outer margin, probably lying betwixt the nervules, and very distinct. The "Acronycta mark" is almost of the shape of an anchor. Reniform stig. light ochrey brown; orb. stig. light gray.

All the transverse lines are very dark brown, edged interiorly with white or light gray, very zigzag; the subterminal and elbowed lines coalesce.

H. W., upper side—Light gray, nearly white, with a small discal brown spot, probably sometimes absent. Fringes and outer marginal spots as in f. w., except that the spots are less distinct, and almost form a line. Under sides of both wings light gray, growing darker toward the margins. The marginal spots as on the upper side. Fore legs annulated; the others gray with dark patches. Head, antennæ, patagia and thorax dark brown. Abdomen of a lighter color, but slightly darker than its under side, which, as well as the under thorax and palpi, are concolorous with the under side of wings. Last joints of palpi dark brown, and it is very probable that in some specimens all the "dark browns" may be "blacks."

With the exception of *funeralis*, this is the prettiest *Acronycta* that I know. N. J., Coll. W. V. A.

Orthosia lutosa, n. s.

F. W.—Wing-stretch 1.5 in. Color brownish gray, slightly darker on the outer margin, where the nervule interspaces are ornamented with seven dark brown, Y-shaped marks, sometimes confluent. A black or dark brown spot at apex of discal cell. Under side rather lighter in color. A brown crescent mark open towards costal edge—25. in. from apex.

H. W.—Basal space rather lighter in color than the f. w.; marginal space nearly as dark. A small, faint, brown discal spot. Under side concolorous with upper, the discal spot much more distinct. All fringes brownish gray and short.

Antennæ concolorous with f. w. Head, thorax and palpi densely clothed with light gray hairs. Abdomen .5 in. long, concolorous with h. w., darker underneath. N. J., Coll. W. V. A., 3 specimens.

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A. S. PACKARD, JR., Salem, Mass.

I have great pleasure in informing you that a new Entomological Society has been formed in this city, under the title of "The Long Island Entomological Society." The following are the officers:—

Rev. Geo. D. Hulst, President; John Akhurst, Vice-President; Thos. Stearns, Treasurer; P. Elbert Nostrand, Rec. Secretary; W. V. Andrews, Cor. Secretary; Fred. Baldwin, Librarian; Chas. Leng, Curator.

W. V. ANDREWS, Cor. Sec'y L. I. E. S.,

187 State St., Brooklyn, N. Y.

I captured a *Meloe* on the 17th of April. I have also in two instances this spring found a male *Cicindela purpurea* paired with a female *C. vulgaris*. May not this sort of thing account for some of the remarkable variations among the *Cicindelidæ*? J. A. MOFFAT, Hamilton, Ont.

Notes on "Fondness of Larvæ for Water" would have appeared in this issue, but we have mislaid the letter containing the name of our correspondent. Would he kindly furnish it again?—ED. C. E.

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EDITED BY

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The Canadian Entomologist.

VOL. IX.

LONDON, ONT., JUNE, 1877.

No. 6

ON A NEW CANADIAN CRAMBUS ALLIED TO CONCHELLUS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Mr. Wm. Saunders has collected a species of *Crambus*, which is apparently unnoticed by Prof. Zeller or Dr. Clemens, who have written most frequently on our American species. The new species, which I call *C. interruptus*, is very easily recognized and has been figured by Prof. Townend Glover on his Plates of Lepidoptera. The head is white; palpi inwardly and beneath white, outwardly dark brown. Thorax white, patagia bright brown. Hind wings and abdomen pearly gray. Fore wings bright brown with a longitudinal white median band obliquely interrupted at the middle of the wing by the ground color. Beyond is a white block on the outer half of the wing, with its inner and outer edges inwardly oblique and its upper edge longer than its inferior margin. Beyond this, before the external margin, is a white band, following the shape of the wing and discontinued above and below. The brown space between this band and the block of white is narrower above than below. In this simply marked species the whole ornamentation seems to be limited to a longitudinal white band, widening outwardly and interrupted mesially and subterminally obliquely by the brown ground color of the wing. There is a sub-obsolete series of minute terminal black points; fringes fuscous, interrupted with white at the middle of the wing and again near internal angle. Beneath the hind wings are almost white; the fore wings shaded with fuscous.

When we compare *C. interruptus* with the European *C. conchellus*, we see that the pattern of ornamentation is very similar in the two forms. The American species differs by the white band before the external margin. In *C. conchellus* there is merely the basal vitta and the outer block of white

scales, and this latter is much larger than in *C. interruptus*. The hind wings are darker in *C. conchellus*, and the thorax and head not so purely white.

C. interruptus has also been taken at Grimsby, Ont., by my kind friend, Mr. J. Pettit. I have seen no specimens from New York State yet, but it will probably occur with us. Its average expanse is 21 mil. For a fine series of *C. conchellus* I am indebted to Prof. Zeller, of Stettin.

A NEW GENUS OF APHIDÆ.

BY J. MONELL, MISSOURI BOTANIC GARDENS, ST. LOUIS, MO.

Colopha, nov. gen.

Antennæ six jointed, wrinkled transversely, and almost moniliform.

Front wings with three discoidals; the cubital once-branched.

Hind wings with one oblique vein.

Wings in repose, usually horizontal.

C. ulmicola (Fitch)—*Byrsocrypta ulmicola* Fitch, N. Y. Rep., ii., 347. *Thelaxes ulmicola* (Walsh), Proc. Phil. Ent. Soc., i., "American Entomologist," vol. i., 108.

The above-mentioned species was originally described by Dr. Fitch (N. Y. Rep., 347), who had not seen the winged form, as *Byrsocrypta ulmicola*. The winged individuals were first described by the late Prof. Walsh, who removed it to "*Thelaxes* Westw." Judging alone from the original description of *Thelaxes* in the "Synopsis of British Genera of Insects," it would be almost impossible to say whether this insect is a *Thelaxes* or not; but Prof. Westwood states in his "Arcana Entomologica" (ii., p. 64) that his genus *Thelaxes* is synonymous with *Vacuna* Kalt.; and since, in addition to other differences, *Vacuna* has five-jointed antennæ, it is evident that our insect can not belong to that genus, and as I can find no generic description which will at all agree with this, either in our American authorities or in Koch, Kaltenback and Passerini, I have presumed it to be new and described it accordingly.

The bibliography of this species really seems like a "Comedy of Errors." Dr. Fitch placed it in a wrong genus; Mr. Walsh removed it to *Thelaxes* and refers to N. Y. Rep., ii., 257, instead of ii., 347. In the "American Entomologist" it is indexed for p. 224, instead of p. 108. Mr. Packard (Guide, p. 525) mentions *Thelaxes ulmicola* Walsh, while on the next page he speaks of *Pemphigus ulmicola* (Fitch), and refers to figure 525, which is from an electrotype of the identical wood-cut first published by Messrs. Walsh and Riley in the "American Entomologist," under the name of *Thelaxes ulmicola* Fitch. Mr. Packard's figure 525 is, therefore, evidently my *C. ulmicola*, and, indeed, I have so far failed to find any other mention of a *Pemphigus ulmicola* Fitch.

NEW PYRALIDES.

III.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Botis vibicalis Zeller, Beitr. ii., 8, Taf. iii., fig. v.

By error in text "*ribicalis*;" correction pages 9 and 131. One of the smallest forms, looking like a minute Heliothid. Fore wings pale yellow with a purple, oblique inner band and an outer of the same hue running parallel with external margin and connected along internal margin with the first band. Hind wings fuscous. Texas (Belfrage, No. 407), August 20th.

Botis nasonialis Zeller, Beitr. ii., 9, Taf. iii., fig. 6.

Texas (Belfrage, No. 406), June 15th.

Botis coloradensis G. & R.

Also from Texas, taken by Belfrage April 25 (No. 379). This species may be known by the white immaculate secondaries. The lines on the primaries are ochreous; in the colored copies of the original plate these lines are incorrectly left black.

Botis atropurpurealis, n. s.

Allied to *vinulenta*. Fore wings of an obscure reddish brown with a purple cast. At first sight appearing immaculate, but the exterior line can be made out by its being followed by scattered yellowish scales; it is similarly shaped to that of *vinulenta* (= *signatalis* ‡), but not angulated on submedian fold. The stigmata are not obvious. The anterior line is partially shown in the same way as the outer line. Hind wings fuscous, paler at base; fringes paler and narrowly interlined. Head and thorax like fore wings. Beneath the body is silky whitish. Wings beneath fuscous with a slight lilac reflection, without obvious markings except on secondaries an indication of a mesial line.

Expanse 15 mil. Texas, Belfrage (No. 362), Sept. 12.

Botis onythesalis Walk.

Larger and with longer body than *sumptuosalis*; similarly colored. Orange yellow; terminal space on both wings shaded with purplish fuscous. Median space on primaries variably washed with purple red. Lines purple, shaped as in *sumptuosalis*, but the outer line running in more deeply on vein 2. Beneath the fore wings are less brightly colored, with the fuscous terminal shade repeated and the discal marks indicated. Above the secondaries show an oblique mesial line, and beneath this is reflected. Body above orange yellow, beneath with legs whitish.

Expanse 19 mil. Hab. Texas, Belfrage (Nos. 364 and 365), March 26, May 25.

Botis Harveyana, n. s.

A small species more slender than *communis*, with pale brown primaries, the exterior line fine, blackish, obsoletely denticulate, rather suddenly drawn in at vein 2, thence back again and angulate before the margin. Outer spot large, annulate. Inner spot obsolete. Before the fringes, which are faintly interlined with pale and are discolorous, there is a distinct sinus of dark points. Hind wings paler than primaries, washed outwardly with the same brown as primaries, with a distinct discal dot and median line. Beneath more ochreous, with the discal dots double on hind wings; a common exterior line; on the primaries the veins are partially darker marked; terminal points very distinct and continuous. Head, palpi and thorax above pale brown, beneath concolorous with under surface of wings glistening.

Expanse 18 mil. New York, L. F. Harvey, July 27 ; Texas, Belfrage (without number, among *communis*), Sept. 25.

Botis flavidissimalis, n. s.

Size moderate. Entirely bright deep yellow; saturate with this color above and below. Costal region of primaries at base a little deeper tinged, and the thorax in front a little ochreous. Under surface of body and legs whitish : fore tibiae marked with brown : palpi dark ochreous, white beneath. Fore wings with two stigmata, dark, nearly solid, the outer annulate. Lines blackish, fine, dentate ; the outer line much bent in to below the outer spot, thus differing from *citrina*, and continued on secondaries. No subterminal line. A terminal series of ochrey points on both wings. Fringes pale yellow. Eyes with a white line. Beneath the costa of primaries is shaded with ochreous ; both stigmata repeated ; a common exterior line.

Expanse 19 mil. Texas, Belfrage (No. 383), June and August.

Botis catenulalis, n. s.

Larger than *ventralis*. Entirely brown, not opalescent. Fore wings with the exterior line not greatly indented below vein 2, and followed by a series of dull yellowish spots opposite the scalloping of the line. Discal spots annulate : all three present : the inferior (claviform) spherical. The transverse anterior line faintly preceded by a pale shade. Hind wings paler than primaries, especially towards internal margin, crossed by a line corresponding to the outer line of primaries, not much indented, continuous, lunulate, the indentations filled in with pale spots as on fore wings. An even dark brown terminal line ; fringes paler than wing, whereas on primaries these are concolorous. Beneath paler than above with the outer common line distinctly repeated as well as the stigmata on fore wings. Head and palpi brown above, white beneath.

Expanse 26 mil. Hab. California ; Coll. Buff. Soc., from Mr. Meske.

Botis fracturalis Zeller.

Collected by Dr. Shannon in Southern Texas ; also by Belfrage, Nos. 385 and 384 ; varies in color of fore wings as does *argyralis*.
March and April.

Eurycreon communis Grote.

Varies excessively in color. Dark wood brown or fuscous specimens

were collected by Belfrage (Nos. 372, 375) on the 25th and 26th of March. On the 5th of November one with red brown primaries. Clypeus with frontal protuberance; a darker form than *vautilis*, formerly incorrectly referred by me to *Botis*.

Botis tatalis, n. s.

A single male specimen (No. 659, Nov. 7). The hind wings are yellow ochre with a subterminal dark line and a trace on the middle of the wing of a mesial line. A discal spot near the base of secondaries, which beneath are ochrey and immaculate. Primaries and thorax dark brown; ornamentation like *communis*, than which this is larger winged. Subterminal shade indistinct; fringes darker than the wing. Beneath fore wings ochrey with a trace of the external line at costa; outer discal spot large, black, inner quite small. Head and thorax above brown; beneath with the legs, pale ochre. Hind wings appear wider and very different in color, almost yellow above, as compared with G. & R.'s figure of *posticata*. I have not their type, but from recollection it is not the present species, which may be known by the subterminal shade on the ochre-yellow hind wings, which contrast with the brown.

Expanse 20 mil.

Of all the species of N. Am. Pyralides described by Grote & Robinson, *Botis posticata* is the only one I do not recognize in the Collection of the Buffalo Society of Natural Sciences. The type may be in Philadelphia or New York. I thought for some time that *communis* might be identical with it, but it will need a comparison of specimens to decide the matter.

Botis penumbralis, n. s.

Allied to *terrealis*, but much larger. Of the same silky gray-fuscous, but stained with yellowish on the veins, the costal margin of fore wings and narrowly along the terminal border of both wings. Abdomen and thorax above yellowish; head, palpi, fore legs and pectus in front obscure yellowish. Thorax and abdomen silky whitish. On the wings the lines are diffuse. No subterminal shade, no stigmata, the cross-vein being indicated by yellow scales. The lines are fuscous, sub-dentate, shaped much as in *terrealis*, but without costal accentuation. This is a more robust species than *terrealis*, and its ornamentation more simple. Beneath the wings are pale silky fuscous, reflecting the common outer line. Fringes pale fuscous, not interlined.

Expanse 31 mil. Ohio (Mr. Drury).

Botis socialis, n. s.

Fore wings triangulate, widening outwardly more than usual. Ground color pale yellow washed with red, especially beyond the outer line, where a broad, diffuse, blackish subterminal band forms the most prominent marking of the wing and appears purplish from overlying bright scales. Transverse lines blackish, linear, trembled. Stigmata small, both solid. Outer line not strongly indented below median vein. Fringes pale, silky, very faintly interlined. The terminal edge of the wing is narrowly red. In one specimen the red shades are more or less absent, leaving the subterminal shade blackish. Hind wings pale yellow, with the subterminal broad shade more or less obviously continued; fringes pale. A fine mesial line. Beneath very pale sericeous yellow, with the subterminal shade and fragments of the exterior line repeated. On primaries discal marks repeated. On fore wings in one specimen the fringe is a little fuscous above. Body yellowish, paler beneath.

Expanse 25 mil. Canada, Mr. Saunders; Buffalo, Mr. Zesch.

Botis allectalis, n. s.

♂. Size of *communis*, but with more pointed primaries and longer abdomen. Gray over fuscous, with a pale ochreous discal patch on the median space surrounding the stigmata. These latter distinct, solid, dark fuscous, the oblique orbicular probably sometimes with paler centre, as it is faintly so on one wing. The lunate reniform followed by a fuscous shade margining the ochreous patch outwardly. T. p. line denticulate with a whitish included shade, setting out the line, not much indented below median vein. The gray scales overlay the fuscous, and when the wing is rubbed are first lost. The costa to t. p. line is ochrey fuscous. Hind wings translucent fuscous with pale line and darker borders. Head and appendages ochrey fuscous. Beneath paler with stigmata and exterior common line apparent.

Expanse 23 mil. Belfrage (No. 445), May 12, Bosque Co., Texas.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

HELIOZELLA.

H. ? œsella. N. sp. ?

I am but imperfectly acquainted with this genus, knowing it only through the Nat. Hist. Tin., vol. xi. ; and the plan of that work does not seem to admit of details of structure. If it is equivalent to *Acchmia*, *Perittia*, *Tinagma* and *Douglassia* combined, as those genera are limited in Ins. Brit., v. 3, then the proper place for this species is in it. But if, as I conclude from the account in Nat. Hist. Tin., it is the equivalent of *Tinagma* alone, and the other groups above mentioned are good, distinct genera, then this species, while possessing affinities with all, would be out of place in either. In Ins. Brit. Mr. Stainton places in *Tinagma* three species, *sericellum*, *stannellum* and *resplendellum*. In Nat. Hist. Tin. these three species, with the comparatively new species *lithargyrella* Zell. and *grisescens* Staint., compose the genus *Heliozella*, none of the species placed in *Acchmia*, *Perittia* or *Douglassia* in Ins. Brit. being placed in it. Prof. Zeller has since (Beit. z Kent, May, 1873) described from Texas a new species, *H. gracilis*—the only species heretofore met with in this country. Possibly *œsella* may prove to be identical with *gracilis*, but I think not, and the particulars in which they differ will be indicated below. Some of these points of difference are structural, based upon the supposition that *Heliozella* is identical with *Tinagma*, as characterized in Ins. Brit., v. 3. For instance, in *Tinagma*, as there characterized, *there is no tongue*, the *ciliæ are long*, the antennæ short, stout and *very much compressed*. In the species before me the tongue is as long as the thorax and naked (as in *Douglassia*) ; the antennæ as stout and thick, not half as long as the fore wings, *not compressed* (unless by “closely compressed” is meant that the joints are closely set), *they are microscopically pubescent, and with a minute basal joint as in Acchmia* ; and the ciliæ have no unusual length, but are rather coarse. I do not detect the marked demarcation between the wings and the ciliæ which Prof. Zeller describes in *H. gracilis*, nor are the wings posteriorly so much narrowed and pointed as from his description I infer them to be in that species. Certainly the hind wings are not so much so as in either *D. ocnorostomella* or *T. serici-*

ellum, as these are figured in Ins. Brit., though the neuration is exactly that of *ocnerostomella*. I have not examined the neuration of the fore wings, but the shape is very nearly that of *sericiellum*, loc. cit. The labial palpi are those of *Tinagma sericiellum*: and the maxillary palpi are about equal to the first joint of the labial.

The ornamentation is that of *Tinagma*, and of the other genera above named as well. There are the usual two silvery white dorsal spots, one near the base, the other at the anal angle; the latter is not a triangle, as it is described in *gracilis*, or if it is triangular, the apex is very obtuse; it points a little obliquely backwards; the other lies parallel to it, pointing also a little backwards, is of the same length but narrower, and reaches the fold. Hind wings pale fuscous; ciliae grayish fuscous. Otherwise the entire insect is of a rich brown, but glittering so with metallic reflections that it is difficult to get a good view of its true color. These reflections from the wings, thorax and abdomen are brassy, or rather bronze; from the head, palpi and under surface of the abdomen, silvery or like burnished steel; the antennae are of the same color with the fore wings, the legs are a little paler. Wing expanse, $2\frac{1}{2}$ lines.

Described from a single specimen taken April 24th, resting on the body of an apple tree (on the edge of a forest, however,) near Covington, Kentucky. I did not observe anything peculiar in its position in the hasty glance which I gave it, and, indeed, was under the impression that it was an early specimen of *Aspidisca splendoriferella* Cham. In Europe species of *Heliozella* are said to appear flying in hot sunshine in May and June. In ten years of dilligent observation, I have never met with a mine resembling that made by *H. resplendellum* (the only species of which the larva is known), except in July and August, 1875, in the region of Mammoth Cave. There a mine was not uncommon in Chestnut leaves. It was a narrow line beginning always by the side of a lateral rib, running thence towards but not to the edge of the leaf, then crossing over the space to the next rib, and passing along beside it down to the midrib, which it entered and burrowed along down it towards the stem, emerging from the midrib through a little slit, looking like two minute half parted lips. I never saw the larva, and saw no trace of its having left the midrib, and cut out from the cuticle of the leaf an oval case in which it might descend to the ground and pass the pupa state like *H. resplendellum*, in *Alnus* leaves.

I believe I have already somewhere alluded to the connection which

exists, or which I fancy to exist, between these small genera of *Glyphipterygidae* and the *Elachistadae* of Mr. Stainton's classification. I can not now refer to the place where I have alluded to the subject, nor am I altogether certain that I have published the observations which then suggested themselves on this subject, as at that time I only knew the *Glyphipterygidae* through the writings of other Entomologists. But it certainly seemed to me that the larvæ of the above-mentioned genera of small species being unknown, there was nothing in the structure of the imago to exclude them from the *Elachistadae*, though the larger genera, *Ascalepia*, *Glyphipteryx*, etc., were allied sufficiently nearly to the *Gelechidae*. But such species as *Æchmia dentella* and *Lithariapteryx abroniæella* unite these small genera and *Glyphipteryx*, so that they cannot be placed in separate families, though the apodal larvæ of *Antispila*, *Heliozella*, etc., do not offer any strong affinities with either *Glyphipterygidae* or *Elachistadae*. While, therefore, it is true that these small genera can not be separated from *Glyphipteryx* and placed in a different family because of being so connected, nevertheless, taken by themselves, in the imago, they still seem to me to show strong affinities with the *Elachistadae*; and, indeed, the older Entomologists placed the European species of *Antispila* in the genus *Elachista*. Do the *Glyphipterygidae* afford a passage from the *Gelechidae* to the *Elachistadae*?

DESCRIPTION OF A NEW TEXAN ANISOTA.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

The following species, new to the fauna of the United States, have been collected by Mr. L. Heiligbrodt, in Bastrop Co., Texas, and the types are contained in the beautiful collection of my friend, Mr. Otto Meske, in Albany.

Anisota Heiligbrodti, n. s.

♂ ♀. The antennæ of the male are broadly bipectinate, except at the tips; those of the female are simple. This species differs from its allies by its purely gray color and by the fore wings being covered by two nar-

row blackish lines. The first of these is sub-basal, irregularly sinuous, produced on the disc; the second is regularly scalloped, interspaceally waved, and runs from apical third to internal margin. The wide median space has a more purely whitish ground, while the wing everywhere is thickly dusted with dusky cells. The usual discal mark consists of two superposed white spots duskily ringed. Hind wings of the same gray with the disc bright rose color, enclosing a large round black discal spot and outwardly limited by a faint mesial band visible towards anal margin. Beneath of the same gray, with the round black discal spots repeated on both wings; the primaries alone are rose color at base, and there is a trace of a common extra-mesial band. Body gray with the sides of the abdomen tinged with roseate.

Expanse, ♂ $2\frac{1}{8}$ inch.; ♀ 3 inch.

Anisota Huiligbrodti, which is named for its discoverer, approaches certain southern species in form, which have been referred by Dr. Boisduval to *Adeloccephala*.

NEW SPECIES OF ORTHOPTERA.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Caloptenus angustipennis, n. sp.

General color light brown. Upper part of pronotum and hind femora with a reddish tinge. Face sometimes mottled. Antennæ light brown infuscated apically. The usual black band behind the eye broad and distinct, and reaching last division of pronotum, bounded below by a narrower white stripe. A broad white stripe from base of elytra connects with a white stripe at insertion of posterior femora, forming a right angle. Outside of hind femora is crossed by two indistinct dusky bands that extend upon upper edge. Lower sulcation reddish. Knees black. Hind tibiae blue. Elytra light brown with very small black spots in the disk.

Frontal costa depressed at ocellus. Head but slightly elevated above pronotum. Foveola of vertex scarcely depressed. Carinae of pronotum nearly obsolete; the median cut by three transverse incisions. Hind lobe of pronotum slightly rugulose. Elytra extending beyond abdomen, un-

usually narrow. ♂ cerci small, narrow, straight, tip rounded and sulcate. Tip of abdomen notched, as in *C. spretus*, but the notch is wider. Length ♀, .95; ♂, .90 inch. Elytra ♀, .75; ♂, .70 inch. Hind femora ♀, .56; ♂, .50 inch.

Banks of the Elkhorn River, Dodge County, Nebraska. August and September.

Caloptenus volucris, n. sp.

Head unusually large. Frontal costa slightly depressed at ocellus, broadening below. Punctate above ocellus. Pronotum slightly constricted in middle. Median carinae distinct, but slight; cut by last transverse incision. Lateral carinae distinct only on posterior part of pronotum. Elytra longer than abdomen. Posterior femora equals abdomen in length. In dried specimen the face is brown, occiput and pronotum a shade lighter. The usual black stripe behind eye to last lobe of pronotum, and testaceous spot below. Elytra light brown, darkest at base, unspotted. Oblique yellow stripe on side of body. All the femora reddish yellow above, the posteriors black at tip, with three brownish patches on upper edge. Hind tibiae blue with black spines, and narrow, black, basal annulation. Under side of thorax and abdomen yellow. Antennae red, darker at tips. Terminal segment of abdomen pointed. Cerci broad at base, rapidly tapering to the middle. The apical half scarcely tapering and ending in a blunt point. Length ♂, .85 inch. Elytra ♂, .70 inch. Hind femora, .45 inch.

Rare and local so far as observed. Habitat, Glencoe, Neb. Time of appearance, September. This species is very close to *Pesotettix autumnalis* Dodge, and differs chiefly in the length of the elytra and wings.

Caloptenus plumbum, n. sp.

Frontal costa sulcate only at ocellus. Vertex slightly sulcate. Median carina of pronotum distinct, cut about the middle by last transverse furrow. Hind border of pronotum angled. Elytra and wings extend beyond the abdomen. Cerci broadest at base and straight until near the apex, when they bend upward—the upper side with a gentle curve, the lower making an obtuse angle—and end in a blunt point. Tip of abdomen rounded.

Color dark inclining to blue. Pronotum with a red, longitudinal

median stripe. Black band behind eye, broadest on pronotum, ending at last sulcus. Yellow spots behind the eye on both sides of black stripe and below the same on side of pronotum. Cheeks bordered behind with yellow. Sometimes face yellow, mottled with blue. A yellow spot at base of antennæ, and a yellow stripe following the lateral carinæ of pronotum on hind lobe, runs obliquely across base of elytra to insertion of hind femora. Elytra brown, with a few dusky dots along the disk. Wings tinged with blue. Upper outside face of hind femora dark blue, the upper edge crossed by the usual dark bands. Hind tibiæ red with black spines. Antennæ light red. Entire under side of insect yellow.

Length of body ♀, 1.00 inch. ; ♂, .85 inch. Of hind femora, male and female, 0.50 inch. Elytra ♂, .75 ; ♀, .80 inch.

Two ♂, four ♀. Found in low grounds during the month of Sept., at Glencoe, Nebraska. Possibly a local variety of *femur-rubrum*.

Pezotettix abditum, n. sp.

Medium size. Frontal costa punctured, depressed at ocellus. Vertex sulcate. Occiput faintly carined. Median carina of pronotum slight, cut by last transverse incision. Lateral carinae obtuse. Elytra short, oval, pointed. Last segment of male abdomen acuminate. Cerci short, broad at base, of equal width from middle to apex. Tip broadly rounded.

General color dark brown. Antennæ red, darker at apex, sides of face and pronotum yellow. The usual black stripe behind the eye ; narrow on pronotum and ending at last sulcus. Elytra dark brown, spotted obscurely and irregularly with black. Hind femora dusky without, with three indistinct black bands that cross over the upper edge and appear on the inside, the one nearest the knee usually broadest and crossing the inner face. Inside and below yellow. Hind tibiae red, spines black. Under side of whole insect bright yellow.

Length of body ♀, .70 inch. ; ♂, .65 inch. Elytra ♀, .27 inch. ; ♂, .23 inch. Hind femora ♀, .45 inch. ; ♂, .40 inch.

Three ♀, three ♂. Taken at Glencoe, Nebraska, where it is usually abundant in August. It occurs upon hill sides, near damp ground, among the rank herbage common in such situations.

NOTES ON LIMENITIS PROSERPINA AND ARTHEMIS.

BY W. H. EDWARDS, COALBURGH, W. VA.

Last fall I obtained a few eggs from a female *L. proserpina*, in Sept., while in the Catskills, and raised eight larvæ to hybernation, which took place after third moult. This spring I have carried four of these to maturity with the following results: The first chrysalis gave butterfly this morning (April 29th), a male *arthemis*. For some hours before the emergence the white band of *arthemis* was distinctly seen through the wing case. The second was but a few hours younger and during this afternoon has given *proserpina* male. I expected this, as here there was no white band on the wing case. The third and fourth produced *arthemis*, making three *arthemis* and one *proserpina*.

After hybernation the fourth and fifth moults took place. As *disippus* undergoes five moults in same way, I presume *ursula* will be found to, and that it is the rule for this genus, in this country at least. We know that *proserpina* is found flying with *arthemis* in the White Mountains and Catskills, and probably in the Adirondacks. But I have never seen it from Canada, though *arthemis* roams over British America from Nova Scotia to low down Mackenzie's River. Can you or can any of your readers tell me whether this form (*proserpina*) has been taken in Canada, or British America, and where, if at all? I wish to get the northern limits of the form, preparatory to illustrating the species in Butterflies N. A. I should be glad to receive letters on this matter from any one who can give the information I seek.

A NEW GENUS AND SPECIES OF GEOMETRÆ.

BY A. R. GROTE, BUFFALO, N. Y.

Meskea Grote (n. g.)

This genus of *Geometræ* resembles *Tornos*; the fore wings are larger and with the apices more produced; the external margin is longer and more oblique. The hind wings are narrow and lanceolate, with the apices pointed and a little depressed; external margin straight or a little incurved. The female abdomen is like that of *Tornos*, and is thickly tufted at the

extremity. This singular genus, which I name for Mr. Meske, may be at once distinguished by the pointed secondaries, narrower in proportion than in any other genus of the group, while the primaries are disproportionately large with straight costa and produced apices.

Meskea dyspteraria Grote (n. s.)

♀. Fore wings of the same cream color as lighter specimens of *Tor-nos*, shaded outwardly on the interspaces with dusky and dotted with dark scale points. The dusky shades become linear between the median nervules, before a fine white interrupted subterminal line near the external margin. The costal edge shows a few separated dusky dots; there are no traces of the median lines; the cell is shaded with dusky, lined on either side diffusely with whitish towards its inner extremity. Hind wings blackish with a white median band showing a series of dark points; anal angle washed with ochrey; a fine terminal black line relieved by a narrow ochre shade. Above the median band is a deeper black discal shade. Body like fore wings. Beneath the wings are much as above, but darker, with the fore wings more mottled with dusky. Antennæ of the female simple. Expanse $1\frac{3}{8}$ inch.

The type of this species is contained in Mr. Meske's collection in Albany, and was taken by Mr. L. Heiligbrodt, in Bastrop Co., Texas.

CENTER, N. Y., ENTOMOLOGICALLY CONSIDERED.

BY JAMES S. BAILEY, A. M., M. D., ALBANY, N. Y.

Center is situated on the line of the New York Central Railroad, midway between Albany and Schenectady. The road in reaching this point traverses a distance of eight miles from Albany, and attains an elevation of 315 feet above tide-water.

During the warm months there are two daily trains stopping at this station, going east and west, and are so arranged as to give the scientist the advantage of the first half of the day on the ground. The place itself is not in the least attractive, consisting of but a few dwellings erected for the accommodation of the Railroad employees.

It is among the pine barrens and seemingly unfertile and inhospitable soil where is found so much to interest and instruct the student, for here

he can commune undisturbed with nature, and at each step find his pathway strewn with objects of interest. Center has a world-wide reputation botanically and entomologically. The collecting ground is embraced in a tract of one thousand acres, which civilization has never disturbed, but has allowed to remain in its primitive condition. It is now owned by a community of Shakers, living in close proximity.

The entomological tract is situated on the south side of the Railroad, and lies on both sides of the road leading to Sloans, any great divergence from which will not prove successful to the collector. It is unnecessary to traverse this road more than one mile, which brings you near to Mount Brizo, which is a bold projecting sand mound rising abruptly nearly to the height of 100 feet above the surrounding country on the east and gradually sloping to the west.

Upon this point has been found annually a few specimens of *Nisoniades Brizo*. During the last summer the number found was limited to a single pair.

The collecting ground has been subject to accidental visitations of fires, which have proven very destructive to the timber and shrubbery. During the last year a fire broke out and burned over 300 acres of timbered land before it could be subdued. The timber was supposed to be destroyed, but, fortunately, later in the season, the foliage put forth with renewed vigor and beauty. Later in the season another fire occurred, but as to the extent of damage done the writer is unable to determine; but many food-plants, caterpillars, pupæ and imagines must have perished in the flames.

The following Lepidoptera have been taken at Center during the last ten years. It must also be a rich field for the Noctuidæ, but as yet sugaring has not been practiced in the vicinity.

It is proposed to sugar systematically and persistently during the coming season, and if successful, the result will be given at another time.

PAPILIONINA, H. S.

Papilio, L.

Papilio turnus, L.

" *troilus*, L.

" *asterias*, Fab.

PIERIDES, B.

Pieris, Schrank.

Pieris rapae, L.

Colias, Fab.

Colias philodice, Godt.

RHOPALOCERA.

Argynnis, Fabr.*Argynnis myrina*, Cramer." *bellona*, Fabr." *atlantis*, Edw." *cybele*, F.*Nymphalides*, B.*Melitaea tharos*, Drury." *nycteis*, Doubleday." *Batesii*, Reakirt." *Harrisii*, Scudder." *phaeton*, Drury.*Limenitis*, Fabr.*Limenitis disippus*, Godart." *ursula*, Fabr." *arthemis*, Drury.

SATYRIDÆ, Swainson.

Neonympha, Hüb.*Neonympha eurydice*, Fabr." *canthus*, L.

LYCAENIDÆ, Fabr.

Thecla, Fabr.*Thecla strigosa*, Harris." *calanus*, Hüb." *irus*, Godt." *augustus*, Kirby." *melinus*, Hüb." *humuli*, Harr." *niphon*, Hüb.*Polyommatus*, Latr.*Polyommatus americana*, Harris.*Lycaena neglecta*, Edw." *lucia*, Kirby." *Scudderii*, Edw." *comyntas*, Godt.

HESPERIDÆ, Leach.

Ancyloxypha, Feld.*Ancyloxypha numitor*, Fab.*Hesperia*, Latr.*Hesperia sassacus*, Scud." *leonardus*, Harris" *bimacula*, Gr. & R." *mystic*, Edw." *otho*, Sm. & Abb." *peckius*, Kby." *viator*, Edw." *maculata*, Edw." *massasoit*, Scud." *hianna*, Scud." *verna*, Edw." *metacomet*, Harris." *zabulon*, B." *delaware*, Edw." *vialis*, Edw.*Thanaos*, Bd.*Thanaos juvenalis*, F." *martialis*, Scud." *persius*, Scud." *Brizo*, B." *icelus*, Lintner." *lucillius*, Lint.*Eudamus*, Swainson.*Eudamus bathyllus*, S. & Abb." *lycidas*, S. & Abb." *tityrus*, Fab.

HETEROCERA, B.

Hemaris, Palm.*Hemaris tenuis*, Grote.*Haemorrhagia*, Gr. & R.*Haemorrhagia gracilis*, Gr. & R.

- Haemorrhagia uniformis, Gr. & R.
 " thysbe, Fab.
 " tenuis.
 " Buffaloensis.
Amphion, Hüb.
 Amphion nessus, Cram.
 SPHINGIDÆ.
 Thyreus Abbotii, Swain.
 Deilephila chamoenerii, Harris.
 " lineata, Fab.
 Darapsa choerilus, Cram.
 " myron, Cram.
 Sphinx drupiferarum, Sm. & Abb.
 " Kalmiae, Sm. & Abb.
 " gordius, Hüb.
 " luscitiosa, Clem.
 Ellema Harrisii, Clem.
 SATURNINA, H. S.
Euchronia, Packard.
 Euchronia maia, Drury.
Hyperchiria, Hüb.
 Hyperchiria io, Fab.
Anisota, Hüb.
 Anisota senatoria, Smith.
 " stigma, Hüb.
 ARCTIDÆ, Stephens.
Spilosoma, Stephens.
 Spilosoma isabella, Smith.
 " virginica, Fab.
 " latipennis, Stretch.
Euchaetes, Harris.
 Euchaetes oregonensis, Stretch.
 " collaris, Fitch.
- THYRIDIDES, H. Sch.
Thyris, Ochsh.
 Thyris lugubris, B.
Aegeria.
 Aegeria pictipes, Gr. & R.
 ZYGAENIDES, Latr.
Ctenucha, Kirby.
 Ctenucha virginica, Carpenter.
Scepsis, Walker.
 Scepsis fulvicollis, Hüb.
Lycomorpha, Harris.
 Lycomorpha pholus, Drury.
Harrissina, Packard.
 Harrissina procris, Harris.
 COCHLEOPODA, B.
Cyrtosia, Packard.
 Cyrtosia albipuncta, Packard.
Limacodes, Latr.
 Limacodes scapha, Harris.
Lagoa, Harris.
 Lagoa crispata, Packard.
 PSYCHIDÆ, B.
Peraphora, Harris.
 Peraphora Melsheimerii, Hüb.
 PLATYPTERYCIDÆ, Stephens.
Dryopteris, Grote.
 Dryopteris, rosea, Grote.
Drepana, Schrank.
 Drepana arcuata, Walk.
 NOTODONTIDÆ, Stephens.
Hypurpax, Hüb.
 Hypurpax aurora, Sm. & Abb.

The following Lepidoptera are extremely local in their distribution, and are found at Center, but not, I believe, elsewhere in New York.

Lyc. Scudderi.

Mel. Harrisii.

Hes. metea.

Thyris lugubris.

" vialis.

Euch. oregonensis.

" delaware.

Neonympha canthus.

" hianna.

Haem. gracilis.

Thecla augustus.

CORRESPONDENCE.

NOTES ON THE FOOD PLANT OF HEMILEUCA MAIA.

Last season I reared a brood of this rare species from eggs sent me by my worthy friend, Wm. Provis, of Detroit. The locality where he found the eggs is in Oakland County, Mich., known as the 5,000 acre tract, and so low and marshy that it is covered with water part of the year. In his interesting letter, giving a description of the place, he says: "The timber is mostly swamp oak and willow, and the land so low and wet I found great difficulty in getting about." Mr. P. was too late to find any of the larvae, they having finished their growth and entered the ground, but the imagines were very plentiful, flying about in a very lazy manner, and occasionally dropping down in such a way as to induce one to think they had been injured..

Many of the females were depositing their eggs—not, as my friend had expected, on the oak—but on a species of wild aster found in abundance in the locality. The oak and aster are, botanically speaking, widely separated, and yet the female, whose instinct ought to teach her what course to pursue for the welfare of her offspring, is found depositing her eggs on the latter as well as the former, which goes to show that the food plants of this species have a far wider range than had been previously supposed. To convince me he was correct, Mr. Provis sent me a stem of the aster with a cluster of eggs in the form of a ring glued to it.

ROBERT BUNKER.

Camp at "Lake Forest," Erie Co., N. Y., June 8, 1877.

Entomology can be pursued with great success when camping out. Here, on the borders of Lake Erie, our camp is pitched on the top of a

sandy ridge, which is covered with hemlock, beech and chestnut trees, and was formerly, no doubt, a reef when the lake was more extended. An outer sand ridge, parallel with ours, runs along the beach and up the lake, while between the two a small creek finds its way into the larger waters. Last night, at "sugar," about the camp, I took specimens of *Habrosyne scripta*, *Acron. noctivaga*, *Charandra deidens*, *Pyrrhia exprimens*, *Zale horrida* and *Homoptera duplicata*. I think *Zale* may be distinguished by its brown, discolorous and exaggerated thoracic tufts. I was much pleased to see many *Sphinges* come to the bait. I took *Thyreus Abbotii*, *Ellibia versicolor*, *Everyx choerilus* and *Sphinx Kalmiæ*. The flight of *versicolor* is more like that of *Kalmiæ* than *choerilus*; the latter sits close to the bait, the tongue being apparently shorter than in *versicolor*. The specimen of the latter which I captured (I saw a second) is fresh, and in looking at it one is reminded of the saying of Marcus Aurelius: "That which is beautiful is beautiful in itself; the praise of man adds nothing to its quality." The *Sphinges* came to the bait till 9:30 o'clock—it being very dark and cloudy; *Kalmiæ* was the earliest to appear. The species of *Lithophane* and *Scopelosoma* are now apparently over. *Heliophila Harveyi* and *phragmitidicola* are common at sugar, as well as *Hadena finitima*, and *Eustrotia apicosa* and *carneola*. A. R. GROTE.

Coalburgh, W. Va., 15th May, 1877.

In my recent Catalogue I named a genus of *Hesperia* on behalf of Mr. Butler, and called it *Lintneria*. It so happens that Mr. Butler had given this name to one of the genera of the Sphingidæ in his late "Revision" of that family, a fact which I only discovered a few weeks ago, and after the Catalogue was published. Mr. Butler proposes the name *Systasea* for the genus of *Hesperidæ* spoken of, which therefore should stand *Systasea* Butl. W. H. EDWARDS.

EFFECT OF HOT WEATHER UPON THE TRANSFORMATION OF THE SPHINXES.

The 28th of last July I found feeding on the Virginia Creeper two larvae of the Satellite Sphinx (*Philampelus satellitia*). One was nearly full grown, and at the end of three days stopped feeding and entered the ground. August 1st passed through its transformations, and came out the 10th of September. It proved to be a very fine female of large size, with colors unusually bright. The above would seem to show that this species in a warm climate would become double brooded.

ROBERT BUNKER, Rochester, N. Y.

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No. 7

REMARKS UPON THE CYNIPIDÆ.

BY H. F. BASSETT, WATERBURY, CONN.

In an article published in the ENTOMOLOGIST for May, 1873, I gave the results of my observations upon the genus *Cynips*, so far as they related to the agamous reproduction of certain species.

I showed that at least two two-gendered species, *C. q. operator* O. S. and a species nearly related to, if not identical with, *C. q. batatus* Bassett, were followed in the next generation by a brood composed entirely of females.

I had reared thousands of *C. q. batatus* of both generations, not for one, but for a series of years, and always with the same results. The early summer brood from leaf galls was always made up of both sexes in nearly equal numbers. The brood from the late summer galls came out in the spring (from twig galls), just as the leaves began to appear, and were all females.

In the case of *C. q. operator* there could be really no room for doubt, as this very peculiar species was repeated, except in size, in the females I took in the act of ovipositing.

If there could be any doubt, it was certainly dispelled when Prof. C. V. Riley reared from the acorn cup galls produced by *C. q. operator*, gall flies exactly like those I had found ovipositing in the buds of the shrub oak.

I advanced the idea in that article that when the true history of the one-gendered species should be known, they would be found to alternate with a generation of males and females. Further proof of this than I now offer will hardly be called for.

Dr. Gustav Mayr, of Vienna, in a letter just received, states that Dr. Adler, of Schleswig, has this year published an "epoch-marking" paper upon the subject of agamous reproduction among the Cynipidæ.*

Dr. Adler finds that what have been described as fourteen distinct species of Cynipidæ—belonging to six distinct genera—are really but seven species.

Four species of *Neuroterons* are found to be the agamous forms of as many species of *Spathegaster*.

Two species of *Aphilothrix* are the agamous forms of two species of *Andricus*, and a species of *Dryophanta* is the agamous form of a *Trigonaspis*.

Dr. Mayr himself was at work upon this problem, but had not succeeded, as his efforts to grow oak trees in his garden had failed. He had not given up the attempt, but had ordered more trees to plant this spring.

Neither Dr. Mayr nor Dr. Adler seem to have seen my article. I communicated the substance of it in a letter to Prof. Albert Müller, then in London. This was read before the London Entomological Society at the meeting of April 7th, 1873, but I notice that English Entomologists continue to talk about Hartig's experiments, and agamous reproduction through an infinity of generations, and of a hypothetical male gall fly that must appear now and then, always just in time to save the race from extinction.

Dr. Adler's paper will no doubt receive the attention it justly deserves and it is to be hoped that the success that has followed his experiments may lead others to aid in developing the history of this singular family of insects.

It is not safe to assume that the history of one species will be the history of all, but the idea that these insects are perpetuated through many generations by unimpregnated females must be abandoned.

* Since the above was written I have received a copy of Dr. Adler's paper; also a letter in which he kindly consents to the publication of all or a part of the paper. I propose shortly to prepare for publication in the ENTOMOLOGIST a summary of his remarkable discoveries.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

GRACILARIA.

G. (Corisceum) albanotella Cham.

The nearest known ally of this species is the European *C. Brongniardellum*, not *C. calicella* St., as I suggested before I knew *Brongniardellum*. *Albanotella* makes a large, somewhat tentiform mine, on the under surface of oak leaves (*Q. obtusiloba* and *Q. alba*); the mine is at first long, winding and *Nepticuli*-form, ending in the large tentiform blotch. The larva, before leaving the mine, becomes pinkish red. In the breeding cage it pupates in a cocoonet which it spins on the surface of the leaves. I have never met with the pupa elsewhere, nor have I ever, although I have seen hundreds of the mines, found one on the upper surface of the leaf. Yet in Colorado I found a precisely similar larva in precisely similar mines, always on the upper surface of the leaves, and the cocoonet of the pupa was always found on the leaves near it. The larva of *albanotella* is abundant in the latter part of May and the first half of June, and I have never seen it at any other time, though from the abundance of the imago in perfect condition in May, I infer there must be a fall brood of the larva. The description should be corrected to state that the ciliae of the fore wings are whitish with the tips at the apex fuscous, and with a wide yellowish hinder marginal line, which sends off two ciliary lines or hooks through the dorso-apical ciliae. The eyes are bright red.

G. fasciella Cham:*Aesyle fasciella* Cham., C. Q. J. S., v. 2, p. 97.

In indicating the new genus *Aesyle* for this species, I committed a mistake very similar to that of Dr. Clemens in establishing his genus *Parectopa* for *P. robinella*, &c., which also belong in *Gracilaria*. *G. fasciella* finds its nearest ally in the European *omissella*, but the fasciae are oblique and angulated in the latter, and are not in *fasciella*, in which they are perpendicular to the margins; *fasciella* has four white fascia separating the five grayish ochreous ones, the last of which covers the apex, which is

white in *omissella*. The position of *fasciella* in repose is that of a *Gracilaria*, but it has not the slender, graceful appearance of such species as *superbifrontella*, *Packardella*, etc., and the shorter, more robust palpi and antennae and somewhat different neurulation indicate affinities with *Lithocolletis*. The second joint of the palpi, though not tufted, is somewhat thickened beneath with scales.

G. (Corisceum) quinquenotella, n. sp.

Very different from *C. quinquestrigella* Cham. ; nearer to *C. albanotella*, but, notwithstanding the small though distinct tuft on the second joint of the palpi, which places it in *Corisceum*, it finds its nearest congener both structurally and in ornamentation in the preceding species, *G. fasciella*.

Pure snowy white ; outer surface of the second joint of the palpi grayish brown ; eyes bright red ; antennae whitish, annulate with fuscous ; thorax with two small brownish specks just before the apex. The marks on the fore wings are grayish fuscous tinged with ochreous, and are placed as follows : there is a basal costal spot extending about one-fifth of the wing length, *sometimes* followed by a small spot about the basal third of the costa ; there is a somewhat oblique streak extending to the fold, and which *sometimes* sends a branch from about the middle of the wing to the costa, thus enclosing a small white costal spot ; then follows a fascia, wide on the costa, where it *sometimes* encloses a small white spot ; at about the end of the cell this fascia curves obliquely back to the anal angle ; it is followed before the apex by another somewhat oblique fascia, and there is still another on the apex ; *sometimes*, however, the apex is yellowish with a small apical brownish spot, followed by a curved hinder marginal line ; the fascia next before the apex is continuous in the dorsal ciliae with a faint dark hinder marginal line, and the fascia *at* the apex is continuous with another similar line ; or both of these lines may be considered as a single interrupted line. Where I have indicated above that the marking is *sometimes* present, it is sometimes present in one wing and absent in the other of the same specimen. Abdomen fuscous, with the hinder half of each segment on the ventral surface white and anal tuft yellow. Legs and tarsi annulate with brown and white. *Al. ex.* 4 lines. Kentucky, June 10th to 15th.

G. 12-lineella Cham.

This specific name may be misleading, and, indeed, I can not say that

I am certain that there are just twelve white or black marginal markings on the fore wings; these color marks are so narrow, some of them so short and sometimes so faint, that it is well nigh impossible to describe the species with anything like accuracy. The most distinct and salient mark is the oblique dark gray or gray brown streak on each side of each segment of the whitish or pale gray ventral surface of the abdomen. Indeed, owing to the indistinct and confused character of the markings on the fore wings, I have sometimes doubted whether I have not two very closely related species before me. I think, however, there is but one, but any, even the least denudation—such, even, as is almost inevitable in pinning and setting a specimen, even where the denudation is so little that it requires comparison with other specimens to detect it—alters the character of the markings so that a description could scarcely be prepared from one specimen by which another could be recognized. The original description was prepared several years ago from three specimens, and I have never seen another until this year (May, 1877), when I have taken two others.

The wings are very narrow, but the general color and the style of ornamentation are much nearer to those of many species of *Ornix* than to any species of *Gracilaria* known to me. It is, however, a true *Gracilaria*, belonging to the same section (as I think) with our *salicifoliella* and the European *Kallasidella*. In perfectly fresh specimens three or four distinct white dorsal streaks are found before the middle of the wing length, one of which is much larger and more curved than the others, and is placed a little before the middle, and there is another and very similar one about the anal angle. There are some five or six tolerably distinct blackish costal streaks, most of them in the apical half of the wing, and very close to each other; they are the dark margins of as many white streaks, which, however, are, some of them (sometimes all of them save one or two), very indistinct. One of these white costal streaks in the apical part of the wing meets at an acute angle the distinct curved white dorsal streak of the anal angle above mentioned, and just behind it an oblique, narrow, much curved white fascia crosses the wing to the anal angle, where it is continuous with the whitish or pale gray hinder marginal line, which crosses the middle portion of the dark gray ciliæ (or the ciliæ may be described as pale gray, with two wide dark gray hinder marginal lines, one at their base, the other at their tips). But the least denudation removes portions of these white and blackish markings, so that they pre-

sent a very different appearance. Perhaps as good a description as could be given would be to say that it is gray mottled more or less distinctly with white and dark gray marginal streaks on the fore wings, the apex of which is dark gray or gray brown.

G. purpuriella Chamb.

This is the nearest known American representative of the European *G. stigmatella*. It differs from that species as described and figured in Nat. Hist. Tin., v. 8, by having the head and palpi brownish red with a purplish gloss, rather than "reddish gray," and the antennæ purplish brown with very faint white annulations, rather than "pale yellowish with brown annulations." The anterior wings might, perhaps, be called reddish brown, but are very strongly suffused with rich purple; the triangle is white instead of yellowish white, and its margins are not darker than other parts of the wing. As in *stigmatella*, the triangle is sometimes produced beyond the fold. The ciliæ in *stigmatella* are described as "rufous, towards the anal angle gray." In *purpuriella* they do not differ from the general color otherwise than that they have less of the purple hue. The statement in the original description that there is a wide white band across the middle of the posterior femora must have been made under an impression produced by a reflection of the light, or by slight denudation, though the statement that the tip is white is correct, and the base is also white. In *stigmatella* the posterior tibiæ are "pale reddish gray"; in *purpuriella* they are sordid whitish (or white suffused with pale reddish brown); instead of "pale grayish fuscous," as in my original description, the posterior tarsi may perhaps be better described as dark brownish gray, and the other tarsi are of the same hue, whilst in *stigmatella* all the tarsi are described as "whitish faintly spotted with pale gray." My specimens range from a little over six to full seven lines *al. ex.*; *stigmatella* is seven lines. It makes the most perfect "cone" of all the species known to me, frequently using up the entire leaf. I have never found it on any willow except *S. longifolia*. The small spots in the triangle vary in number and size. The most striking difference on comparing a specimen of *purpuriella* with the figure of *stigmatella*, is in the ciliæ of the fore wings, which in *stigmatella* are much paler, more yellowish, while in *purpuriella* they are so dark as to make it somewhat difficult to detect the three hinder marginal lines.

G. erigeronella.

G. plantaginisella Cham.

In one of the vols. of the Zoo. Rec. the Recorder has expressed some surprise at my having changed the name of a species first described by me because I had discovered its food plant. Nevertheless, the practice is so general, and, in my opinion, it is in every way so convenient and proper, to give to the *Tineina* specific names derived from the food plants of the larvæ, that I can not but think it best to adhere to it rather than to an arbitrary rule of priority, especially where the name first given has probably never been used except by the person who bestowed it, and where the change is made by that person, and the first name is not only inappropriate, but misleading, as it would be in this instance. It is not necessary to explain how I was led into the error of supposing that this species feeds on *Plantago* instead of *Erigeron*.

There is a *Gracilaria* larva which, when very young, makes a small mine in the upper surface of the leaves of the Hop hornbeam (*Ostrya Virginica*), but I have never been able to have its subsequent history. Like some other larvæ of this genus, when very young, it shows some resemblance to the flat group of larvae of the genus *Lithocolletis*.

NOTES ON LARVÆ—FONDNESS FOR WATER—HINTS TO BEGINNERS.

BY C. G. SIEWERS, NEWPORT, KY.

Last spring, while collecting beetles under the bark of decayed logs, I met with numbers of the larvæ of *Arctia isabella* (hairs brown in the middle, black at each end of larva.) about to spin up. Not knowing their hibernating habits, they had always baffled me, and under the impression that they would require another season to mature, had been turned loose. I collected some twenty, put them into a box with cotton and paper scrap, and they at once spun up, all but four. These wandered up and down for a week, having some want, and wasting away. It

struck me they might want water. Wetting a sable, I proffered a drink. They all drank greedily, grasping the brush with their fore-legs, and even following it around. I watered them two or three days, but tired of this and threw them out. The same day they were found spinning up on the fence. This spring I collected another lot, and gave them some curved bark to spin in. About one half refused to spin. I soused them with water. Two remained contumacious, but another wetting brought them to terms. The black larva of the Great Leopard Moth, *Ecpantheria*, hibernates also, spins up about the first of June, and emerges about the 15th with us. Feeds on Poke-berry plant, and will eat cabbage. I failed to winter some twenty this season. Either they dry up in the house, or mould in the cellar. They should be wintered out-doors, in a box without bottom placed on the ground and half filled with leaves and brush, exposed to the weather, but having proper drainage. They come out of the leaves in the spring distended by moisture. Whether they feed before spinning is uncertain. I collect them in the fall at the foot of willow trees, when digging up the pupa of *Smyrinthus geminatus*.

It is generally claimed that moist leaves will induce scouring in the *Bombix mori*, but out-door larvæ get abundance of rain and dew, and may require it. In confinement they fail to get their full growth. Their food should be sprinkled daily. The great difficulty of keeping the food fresh deters many from rearing larvæ. To such I would say, try tin boxes or glass jars. Clean daily and keep moist. Two or three drops of water are sufficient. I have had a lot of empty fruit cans capped, and have kept food fresh in them for ten days. When the nearest food plant is three miles distant this is some object. I find that they do not require light, and but little air. When they cease feeding, remove to spinning or ground boxes. The ground must be kept moist, or the larva will be unable to remove the skin around the thorax, and strangle. If they find it too dry they will come out and try to escape. Many wander about for a day or two before burying themselves. Covering the ground with sod often expedites matters. When ten days have passed they may be sifted out to give place for others, and laid out in another ground box on top, as it is preferable to have them in sight, on account of vermin. Never pull larvæ from their food, especially when moulting in changing food. Clip the old food off around them, and they will change themselves. Placing some hungry *Apatura clytons* three inches from fresh food, they struck a bee line for it.

Raising larvæ is by far the most instructive feature of Entomology, and very interesting. Entirely too little attention is paid to it. We want the whole life. How utterly ignorant we are, for instance, about the larvæ of *Catocala*? Let all faulty females be confined, and they may lay impregnated eggs; try the young on willow, walnut or oak leaves. The female is known by the heavy body tapering to a point; the male terminates in a pair of claspers. Some species are readily determined by their antennæ, the males being more broadly pectinated than the females.

The larvæ of wood-boring beetles can be raised in tin or glass on wet saw-dust (not pine); any mixed hardwood or poplar will do. I have kept them so six and eight months, changing the saw-dust once a month. But they are very tiresome, as one may have to keep them a year or two.

ON A NEW SPECIES OF COSSUS.

BY J. A. LINTNER, N. Y. STATE MUSEUM NAT. HIST., ALBANY.

Five years ago, I discovered at Center, in the trunks of poplar trees (*Populus tremuloides*) several pupal cases of a *Cossus*, which, by their differing from the other cases known to me, of *C. Robinie* and *C. querciperda*, I had reason to believe was an undescribed species. This year, on the 14th of June, on examining some infested trees, several pupal cases were discovered projecting half-way from the trunks, and an inago, which had apparently just emerged, and was resting on the stump of a broken limb. The colors of the moth so exactly simulated the surface on which it rested that it was with difficulty observed, even when looking directly at it. The moth, in all probability, is an undescribed species, for, from the description given by Walker of a *Cossus* found at Hudson's Bay, and named by him *C. populi*, it must differ from that species.

In recognition of the very large number of rare Lepidoptera which the Center locality has yielded and still continues to give to persistent exploration, I propose for it the name of *Cossus Centerensis*.

The female, in its appearance, approaches nearer *C. querciperda* than any other of our species. The collar and thorax are black, edged with grey scales. The abdomen is black above, interspersed with grey scales toward its tip, and more thickly beneath. The primaries are black over rather more than their inner half, with some grey scales a little within the centre of the wing; the centre portion of the wing beyond the reniform is greyish. The wing is traversed by broken, black, transverse lines, of which twenty or more can be counted on the costal margin; three or four of those on the outer portion are more continuous and conspicuous than the others. The fringe is marked with black scales opposite the veins. The secondaries are nearly transparent, darker along their inner margin, showing some faint reticulations, which are more conspicuous beneath.

The male strongly resembles the female, instead of presenting the marked contrasting differences found in *C. robiniae* and *C. querciperda*. Its wings are only a little more projected apically than in the other sex.

Expanse of wings of the pair in my collection, ♂ 2 inches; ♀ 2.5 inches. Length of body, ♀ .95 inch.; ♂ 1.20 inch.

Subsequently to the capture of the above, several additional examples have been taken in the same locality. On the 18th June four specimens were collected by Mr. Meske.

NOTICE OF MR. BUTLER'S REVISION OF THE SPHINGIDÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The object of this notice is to call the attention of American Entomologists to a most excellent and complete "Revision of the Family Sphingidæ," by Arthur G. Butler, of the British Museum, which has appeared in the Transactions of the Zoological Society, London, in quarto form. A proper arrangement of the Sphingidæ of the world is a work requiring both extensive material and great experience and tact, of which

Mr. Butler has shown himself to be equally possessed. It is not my intention at this time to discuss minor points (such as Mr. Butler's citation of *Philampelus satellitia* Harris to Linne's species of that name instead of to *pandorus*, where it belongs), or the larger questions as to the number of groups, Mr. Butler separating the *Ambulicince* from the *Cherocampine*, while Grote and Robinson in 1865 left them united. The arrangement, indeed, is virtually that of our synonymical catalogue of 1865; the genus *Acherontia*, not represented in America and left out of consideration by ourselves, is made into a separate sub-family *Acherontiinae* by Mr. Butler. I wish merely to note here the changes which I am at present willing to admit in the arrangement proposed in the "Check List of North American Sphinges" published by myself in 1875.

Hæmorrhagia G. & R.

I do not admit that *Buffaloensis* and *uniformis* are identical. The former is smaller sized and there is a slight toothing or unevenness of the inner margin of the terminal band of the primaries. The discal cell is reduced and the transverse scale line tends to be absorbed by the scales clothing the median vein. Nor do I admit that Kirby's *ruficaudis* is the same as *uniformis*: I have shown that Kirby's description boldly contradicts it. There is some warrant for believing that Kirby intended *diffinis* or a species of *Hemaris*, as I have shown, CAN. ENT., 6, 170. Mr. Butler's *ruficaudis* is probably *uniformis*. The Albany collectors take both *Buffaloensis* and *uniformis* (Mr. Lintner has reared *Buffaloensis*), and we may look for further careful and consequently decisive information from them in regard to these points. Although Mr. Butler speaks adversely, and perhaps a little vexatiously, on p. 518, as to the validity of the genus, on p. 521 he says of *Hæmorrhagia*: "This may, perhaps, be a genus, the species being more densely scaled than in *Hemaris*, and having consequently a somewhat different aspect; on the whole, however, I prefer to regard it for the present as a section." The reason, if I remember rightly, that we were not certain of the generic position of *radians* was that we did not know the species, nor have I seen it since 1865.

Callenyo Grote.

This term should be employed, I think, for *carinata* as distinguished by Mr. Butler from *Aleuron* (*chloroptera*, etc.).

Everyx Boisd.

Having in 1865 restricted Walker's term *Darapsa* to *rhodocera*, I should not again have used it for this genus. I abandoned my restitution of Hübner's term *Otus* for this genus because the term is preoccupied in ornithology. Boisdual's term must stand for the species, which are apparently four in number, *syriacus* from Asia, and *chærilus*, *myron* and *pholus* (W. J.) from America.

Elibia Walk.

To this genus Mr. Butler refers *Chaerocampa versicolor* of Harris.

Smerinthinæ.

The genera proposed by myself are for the most part adopted. I am not now prepared to accept the extension of *Calasymphobolus*. The following change seems to be proper :

Triptogon Brem.

To this genus should be referred the *Smerinthus modesta* of Harris.

[Since writing the above, Mr. Butler has kindly replied to my note to him conveying the substance of the foregoing remarks as to *C. astylus*. I feel authorized to take *S. geminatus* as a new generic or sub-generic type under the name *Eusmerinthus*, differing from *ocellatus* of Europe and *ophthalmicus* of California in the shorter subcostal nervules of fore wings, the angulated external margin, while the median vein runs close to the subcostal for one-third its length ; while the median branches are shorter, the wing may be seen to be markedly distinct in form. In the hind wings the apices are more rounded and the outline differs by the indentation before anal angle. The antennae are comparatively shorter. I am indebted to Mr. Butler for sketches and notes defining this group, in which I would include *cerisii*, *coecus* and *Kindermanni*.]

Sphinginæ.*Isognathus* Feld.

Mr. Butler omits to note that I adopted this genus for *rimosa* and *congratulans*, Tr. Am. Ent. Soc., 185. I am not now in possession of any of my material of the species of *Dilophonota*. I think that Mr. Butler has been rash in his conclusions, in view of the fact that he had no material from Cuba before him. Boisdual adopts my identification of

oenotrus, and, on the whole, I am decidedly of opinion that Mr. Butler has again brought confusion into the difficult group by his synonymy, which is at variance with that given by Dr. Boisduval and myself.

Protoparce Burm.

As having priority over *Macrosila* Walk., Mr. Butler refers our species to this genus of Burmeister's. Boisduval claims the term *Macrosila* for *tetrio*, but for this species *Pseudosphinx* has priority.

LIST OF CANADIAN DIPTERA.

BY WM. COUPER, MONTREAL, P. Q.

The following list of Canadian Diptera has been compiled from British Museum catalogues for 1848 and '49. The greater number of the species were described by the late Francis Walker. Those from Hudson's Bay were collected by Geo. Barnston, Esq., of Montreal, when residing at St. Martin's Falls, Albany River. The material from Nova Scotia was presented by Lieut. Redman to the British Museum. I have not included the species collected by Mr. Doubleday in the United States, nor those recorded as coming from North America. A few species from Newfoundland and New York Factory are also omitted.

FAM. I. TIPULARIÆ.	Chironomus nigritibia, Hudson's B.
Sec. I. Culiciformes.	“ albistria “
	“ crassicollis “
Culex stimulans, Nova Scotia.	“ unicolor, Nova Scotia.
“ impatiens, Hudson's Bay.	“ lasiomerus, Hudson's B.
“ punctor “	“ festivus “
“ impiger “	“ lasiopus “
“ implacabilis “	“ attenuatus “
“ provocans, Nova Scotia.	“ flavicingula “
Chironomus bimacula, Hudson's B.	“ fimbriatus “
“ confinis “	“ trictiomerus “

<i>Chironomus brunneus</i> , Hudson's B.	<i>Mycetophila parva</i> , Hudson's Bay.
" <i>pellucidus</i> "	" <i>plebeja</i> "
<i>Tanypus decedens</i> "	" <i>obscura</i> "
<i>Ceratopogon transiens</i> "	" <i>despecta</i> "
" <i>parvus</i> "	<i>Sciara exigua</i> "
" <i>obscurus</i> "	" <i>robusta</i> "
<i>Asthenia americana</i> "	" <i>atrata</i> "
<i>Lasioptera parva</i> "	" <i>perpusilla</i> "
<i>Cecidomyia spongivora</i> "	" <i>polita</i> "
<i>Psychoda degenera</i> "	" <i>abbreviata</i> "
<i>Pedicia albivitta</i> , Nova Scotia.	<i>Simulium decorum</i> "
" <i>contermina</i> "	" <i>invenustum</i> "
<i>Limnobia simulans</i> , Hudson's Bay.	<i>Scatopse nitens</i> "
" <i>badia</i> , Nova Scotia.	" <i>obscura</i> "
" <i>cana</i> , Hudson's Bay.	" <i>pusilla</i> "
<i>Tipula triplex</i> , Nova Scotia.	<i>Arthria analis</i> "
" <i>duplex</i> "	<i>Penthetria atra</i> "
" <i>borealis</i> "	<i>Dilophus serraticollis</i> "
" <i>maculipennis</i> "	" <i>fulvicoxa</i> "
" <i>frigida</i> "	<i>Bibio humeralis</i> , Nova Scotia.
" <i>dorsimacula</i> "	" <i>scita</i> "
" <i>alterna</i> "	" <i>vestita</i> "
<i>Ptychoptera metallica</i> , Hudson's B.	" <i>fumipennis</i> , Hudson's Bay.
<i>Hesperinus brevifrons</i> "	" <i>striatipes</i> "
<i>Bittacomorpha clavipes</i> , N. S.	" <i>gracilis</i> , Nova Scotia.
<i>Anisomera longicornes</i> , Hudson's B.	
<i>Chionea aspera</i> "	FAM. II. XYLOPHAGI.
<i>Trichocera bimacula</i> , Nova Scotia.	<i>Beris quadridentata</i> , Hudson's Bay.
<i>Asindulum tennipes</i> , Hudson's Bay.	<i>Xylophagus fasciata</i> "
<i>Diomonus nebulosus</i> "	
<i>Sciophila rufilatera</i> "	FAM. III. TABANII.
<i>Leja unicolor</i> "	<i>Tabanus calens</i> , Nova Scotia.
" <i>varia</i> "	" <i>Tarandi</i> , Hudson's Bay.
" <i>trifasciata</i> "	" <i>flavipes</i> , Nova Scotia.
<i>Mycetophila bifasciata</i> "	" <i>affinis</i> , Hudson's Bay.
" <i>propinqua</i> , Nova Scotia	" <i>zonalis</i> "
" <i>contigua</i> "	" <i>melanocerus</i> "
" <i>lata</i> "	

<i>Tabanus vicinus</i> , Hudson's Bay.	<i>Thereua conspicua</i> , Nova Scotia.
" <i>inscitus</i> "	" <i>senex</i> "
" <i>frontalis</i> , Nova Scotia.	
" <i>intermedius</i> , Hudson's B.	SUB-ORDER PROBOSCIDEÆ.
" <i>imitans</i> "	FAM. VII. BOMBYLIARII.
" <i>gracilis</i> , Nova Scotia.	
" <i>marginalis</i> "	<i>Anthrax oedipus</i> , Nova Scotia.
" <i>simulans</i> "	" <i>fascipennis</i> "
<i>Chrysops vittatus</i> "	" <i> analis</i> "
" <i>furcatus</i> , Hudson's Bay.	" <i>vestita</i> "
" <i>moereus</i> , Nova Scotia.	" <i>fulviana</i> "
" <i>sepulchralis</i> , Hudson's B.	" <i>bastardi</i> "
" <i>carbonarius</i> , Nova Scotia.	" <i>lateralis</i> "
FAM. IV. LEPTIDES.	<i>Bombylius pygmaeus</i> , Hudson's B.
	" <i>major</i> "
<i>Rhagio intermedius</i> , Hudson's Bay.	<i>Dasypogan sexfasciata</i> , Nova Scotia.
" <i>mystacea</i> , Nova Scotia.	" <i>argenteus</i> "
<i>Leptis proxima</i> "	" <i>falto</i> "
" <i>reflexa</i> "	" <i>lutatius</i> "
" <i>quadrata</i> "	<i>Laphria æeatus</i> , Hudson's Bay.
" <i>fumipennis</i> "	" <i>posticata</i> , Nova Scotia.
<i>Atherix variegata</i> , Hudson's Bay.	" <i>thoracica</i> "
FAM. V. XYLOTOMÆ.	" <i>sericea</i> "
	" <i>sacraator</i> "
<i>Thereua vicina</i> , Nova Scotia.	<i>Asilus lecythus</i> "
	" <i>apicalis</i> "

A NEW PLUSIA ALLIED TO HOCHENWARTHII.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

M. C. R. v. Osten Sacken has been kind enough to send me a few Noctuidæ collected by himself in Colorado and the West. Among them

is a new *Plusia*, allied to *alticola* and the yellow-winged European species, which I dedicate to its discoverer under the name of *Plusia Sackenii*. It is larger than its allies, and to be at once distinguished by the transverse posterior line being inwardly bent opposite the cell. Fore wings dark gray, with the median space below the median vein rich brown, reminding us of *ampla*. Interior line golden, arcuate, interrupted on cell, inaugurated on costa by an interior golden patch. Cell shaded with light pinkish gray. Reniform moderate, upright, apparently open to costa, with fine golden annulet, preceded by a dusky costal shade. Metallic mark smaller than in allied forms, and open or v-shaped outwardly. Beyond it an elongate pale golden spot separate. These metallic marks are set in a richer brown. Transverse posterior line geminate, concave, slightly trembled superiorly, below median vein (or rather vein 3) with a fine golden interior line and edged by reddish brown on median space, while there is a spot of same color outside the line at its rounded termination near internal angle. Subterminal line indicated by difference in shade color, dentate. Hind wings light yellow above and below, with a moderate black marginal band. Costa beneath somewhat brownish, and a small discal dot is apparent; above the base is dusky and there is a faint and narrow lunule.

This species was taken at Idaho Springs, Colorado, on Aug. 15th; the specimen bears the number "2." It differs strongly by the ornamentation of the primaries from any known species of the yellow-winged group. The internal margin of primaries is more sinuate and the habitus is rather that of *ampla* and allied forms with dusky secondaries. The new species expands 34 mil.

I avail myself of this opportunity to correct two errors in certain of my previous communications. On page 89 of this volume I should have given Prof. Lintner and not Mr. Hill the credit for the observation on *edusa* and *lunata*. We owe very much to the patient investigations of Prof. Lintner with regard to our moths, and I need no excuse to praise his carefulness nor the superb condition of the Albany collections under his charge.

On page 106 a correction must be made: for *vautalis*, read *rantalis*.

BOOK NOTICES.

Economic Entomology, by Andrew Murray, F. L. S., London, England. Aptera, 8vo., pp. 433, profusely illustrated with wood-cuts.

This useful volume is the first of a series of hand-books which are intended to serve as guides to the different departments of the collection of Economic Entomology in process of formation at the Bethnal Green branch of the South Kensington Museum, and also as practical treatises for the use of the public generally. In order the better to serve its primary purpose of guide to the collection, the contents of the several cases are described in this volume in the order in which they present themselves to the visitor, containing in some instances other specimens than insects. The work opens with a short chapter on Crustaceans likely to be mistaken for insects; for example, species of *Oniscus*, *Porcellio* and *Armadillo*. Next in order are the Myriapods—Julidæ and Scolopendridæ; then Scorpions and their allies; Spiders, Mites, Lice, Thysanura (Spring-tails) and Lepismidæ. Three new genera and thirteen new species are described in this volume.

The descriptions are briefly and plainly written, and the habits and life history of the species are delineated in a pleasing and popular manner. The work is well printed in good, clear type, and most of the illustrations are excellent. Already we have found it very useful, giving in a condensed form a vast amount of information not otherwise readily obtainable. We heartily commend this work to our readers, and trust that the talented author may be spared to complete the series proposed, which will appear in the following order: 2nd vol., Bugs; 3rd, Locusts, Grasshoppers, Cockroaches and Earwigs; 4th, Two-winged Flies; 5th, Bees, Wasps, &c.; 6th, the Dragon Flies and May Flies; 7th, Butterflies and Moths, and lastly, the Beetles.

Ninth Annual Report of the Noxious, Beneficial and other Insects of the State of Missouri. By Chas. V. Riley, State Entomologist, March, 1877; 8vo., pp. 129, with 33 illustrations.

We welcome the ninth of this series of valuable reports with much pleasure. The following are the subjects treated of in the order in which they appear: The Gooseberry Span Worm; the Imported Currant Worm; the Native Currant Worm; the Strawberry Worm; Abbott's White Pine

Worm : LeConte's Pine Worm ; the Colorado Potato Beetle ; the Army Worm ; the Wheat-head Army Worm ; the Rocky Mountain Locust ; the Hellgrammite Fly, and the Yucca Borer. The bulk of the report, sixty-seven pages in all, is occupied with details in reference to that terrible scourge of the West, the Rocky Mountain Locust, *Caleptenus spretus*, the other and less important subjects being much more briefly treated of. These reports contain an immense fund of valuable information, and have done much to popularize Entomology in America.

Harpalus caliginosus from Nature, by Franklin C. Hill ; two plates. We are indebted to Mr. Franklin C. Hill, of Princeton College, N. J., for copies of these excellent plates, recently published. They are beautifully finished and conveniently mounted on cards, 5 x 8, with all the organs and divisions both of the under and upper surface, distinctly named. They will prove a valuable help to beginners, and indeed to all who are not already familiar with the names of the different portions of the body of Coleopterous insects.

CORRESPONDENCE.

AN INSTANCE OF RETARDED DEVELOPMENT.

On the 24th of September, 1875, I took a great many large caterpillars of a reddish buff color, with a dark dorsal stripe, feeding on willow. They soon went down to the soil and spun themselves up in hard brown cocoons, when I put them away for the winter. In the spring of 1876 I brought them to the heat, and after waiting some time and nothing appearing, I opened one of them and found the caterpillar alive and as fresh in color as when it first spun up. In this condition they continued until the fall, when I again put them away for the winter. In the spring of 1877 I again examined them, and found them fresh and with signs of life, but as the season advanced I opened some and found them dead, and the remainder having assumed a shrivelled look, I laid them aside as hopeless. On the 17th of June my attention was attracted by a scratching noise, which I found came from these cocoons, which were now reduced

in number to six. On lifting, I found one of them rattling and shaking with great vigor : I returned it to the box and waited three days, when nothing appearing, I broke it open and a fully developed fly walked out in a very feeble condition. Its length was 1 inch. expanse $1\frac{3}{4}$ inches. Head, thorax and legs black, antennæ and feet yellow ; abdomen brown ; a yellow spot between thorax and abdomen : wings light smoky brown.

J. A. MOFFAT.

Hamilton, June 26th, 1877.

MELITAEA PHAETON.

I have caught this summer over fifty specimens of *Melitaea phaeton* ; they have been extremely common here. I saw a gentleman recently from Ottawa who told me that he could have caught them by the hundred in that neighborhood, they were so very abundant.

GEO. W. PEARSON, JR., Montreal.

HOW TO DESTROY CABINET PESTS.

There is nothing more annoying to the experienced, or more discouraging to the young collector, than to have his specimens destroyed by mites, by the *Anthrenus*, or by the larva of *Dermestes*. Against the ravages of these enemies there is no security. Paste and paper fail to exclude them ; camphor is only a partial protector, and the only safeguard of our cabinets is constant vigilance, and the instant destruction of the offenders when observed.

For this purpose many methods have been suggested—saturation with turpentine, immersion in alcohol or benzine. exposure to a heat of 210 degrees in a drying closet or oven, &c. : but most of these ways are apt to injure, or even destroy the specimens, while the last is often ineffective. Having, however, found a certain and rapid method of dealing with these intruders, I desire, through your pages, to make it known to my brother naturalists.

Some two years ago, I had a magnificent female *Platysamia* (*Saturnia*) *cecropia*, measuring $6\frac{7}{8}$ inches across the wings when set out, which came out of a chrysalis in my breeding box. I succeeded in killing and stretching it without damage, and when dry, transferred it to my interim box, which hung against the wall. In about a fortnight I was annoyed to

see its antennæ cut off, the head and thorax denuded of most of their down, and some large holes made in the abdomen. After some consideration, I placed a gallipot, containing about 25 grains of cyanide of potassa roughly bruised, with a very little water, in the bottom of the case. I then introduced six drops of sulphuric acid, and let down the glass. In less than a minute I had the satisfaction of seeing a fine, stout *Dermestes* larva writhing in the death agony on the bottom of the box. Since that time I have tried the same several times, and always with the same success. It is equally applicable to the extermination of moths, &c., in stuffed birds and quadrupeds, as no animate being can inhale this gas and live.

JAMES T. BELL, Belleville, Ont.

[NOTE.—Great caution would be necessary in using this remedy, not to inhale any of the highly poisonous gas which by the use of the ingredients named would be rapidly generated.—ED. C. E.]

In October, 1875, I found *Meloe angusticollis* Say in large numbers in our potato fields, but could not find any feeding on the vines. About 25 or more found their way into our gardens, and almost completely devoured a few plants of *Anemone japonica* (*Ranunculacæ*). We have a large collection of annual and perennial plants, but the *Meloes* could find nothing to suit their tastes but these *Anemones*. We had no *Ranunculus acris* on our grounds.

Yours respectfully,

CHAS. D. ZIMMERMAN, Buffalo, N. Y.

LIMENITIS PROSERPINA.

Limenitis proserpina has been taken in this locality now and again, but rarely more than one in a season, and always in connection with *arthemis*.

J. A. MOFFAT, Hamilton, Ont.

CAPTURES AT SUGAR.

I have taken at sugar at Morristown, N. J., *Ellibia versicolor*, *Everyx choerilus* and *E. myron*.

GEO. W. PECK, New York.

AGROTIS FENNICA WANTED.

I very much want four or six good specimens of *Agrotis fennica*. I believe the insect, though certainly not common, is by no means a rarity in some localities in Canada, but I am at a loss to whom to address myself.

W. T. DOBREE, Hull, England.

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VOL. IX.

LONDON, ONT., AUGUST, 1877.

No. 8

ON THE PREPARATORY STAGES OF SATYRUS NEPHELE.

BY W. H. EDWARDS, COALBURGH, W. VA.

I have tried for several years past to raise larvæ of *Satyrus nephele* to maturity, but met with no success till this last spring. It is very easy to obtain the eggs by confining the female with a tuft of grass. I tied a gauze bag on such a tuft set in a flower pot, while in the Catskills, and 21st August, 1876, obtained perhaps fifty eggs. Some were laid on the blades and stems of the grass, but many were dropped loose on the ground. The eggs hatched about the 21st of September, and the young larvæ without feeding entered upon their hybernation. I brought them to Coalburgh and transferred them to grass set in a pot. They were not so sound asleep but that they were able to attach themselves to the stems. The plant was placed in as cool a room as I could give it, and allowed to die, the larvæ remaining on the dried stems. On 29th Jan'y I found that about one-third of the larvæ were still alive, and I placed them on fresh grass in the greenhouse. These were feeding 1st February, as I could see by the bits cut from the edges of the leaves. The color of the newly hatched larvæ was carnation, marked by horizontal carmine lines, but very soon after beginning to feed they turned to pale green, and the stripes changed from red to a green darker than the ground. The appearance of the larva at this first stage is very singular, owing to the long curved bristles which arm the back and sides, giving a general resemblance to a fish bone. The 1st moult was passed 26th Feb'y and next following days. The 2nd on 21st March; the 3rd, 3rd April; the 4th, 18th April: the first chrysalis formed 16th May, and the butterfly emerged 30th May. The stages were unusually long, but I find that characteristic of all species of *Satyridae* that I have bred. And the larvæ are sluggish, moving very little and

slowly. In their general appearance after the first stage—in shape of body and head, and the form of the second segment—and in their habits, the larvae of some of the species resemble the larvae of *Hesperidea* closely, and there is a marked likeness between some of the *Satyrid* and *Hesperid* chrysalids. The coloration in all the stages after hybernation in *nephela* is that of the grass the larva feeds on, or very nearly, and the larvae, although so slow in their motions, fall from the stems at the least alarm ; so that they are sufficiently protected in their natural state against most enemies. The resemblance between the larvae of *nephela* and *sosybius* is very close indeed. So between the chrysalids, while *gemma*, usually grouped with *sosybius*, has quite a different caterpillar and chrysalis. *Eurytris* is much like *nephela*, except in color. I will soon give full descriptions of all these species in their early stages.

EGG OF NEPHELE—Conoidal, somewhat flattened at base, truncated at top, the sides rounded ; about 18 vertical ridges, with rounded excavations between, spring from the lower part of the side and run to the edge of the top ; this last is rounded, and covered with shallow cells, irregularly hexagonal around the outside, and in the middle long and narrow about an oval central cell. Duration of this stage 28 days.

YOUNG LARVA—Length one-tenth inch ; the anterior segments thickest ; on each side are three rows of long white bristles, one row being at the edge of dorsum, one on middle of the side, and one over the feet ; these spring from very prominent papillae, and the effect is to make the larva seem many sided ; the dorsal rows have one bristle on each of segments 2, 3, 4, but two on each of the others to last, and these are all curved back ; the second row has one to each segment and all are curved forward except on two last segments ; the lower row has two to each, and all are curved back ; color of body carnation ; there is a medio-dorsal crimson line, and three such lines close together on the side ; head large, one-half broader than 2, broader than high, sub-globose ; color light yellow-brown, specked with brown, and sparsely pilose ; on some examples there are cloudy brown patches over the upper part of the face. Larvae hibernate at this stage.

AFTER FIRST MOULT—Length $\frac{1}{16}$ inch. ; cylindrical, thickest anteriorly ; the last segment terminating in two round, tapering and sharp appendages or tails, which are green, red at tips ; these are not divergent from a common base, but each starts from the extreme side, and the interval between their bases is square ; color pale green, crossed longi-

tudinally by dark green stripes, one rather broad, medio-dorsal, and three close together on side : each segment creased several times, and on the ridges thus caused are white papillae, each sending out a blunt white hair : head nearly as before, a little broader than 2, somewhat broader in proportion to the height, light green, with white papillae in vertical rows, each with white hair. Duration of this stage 23 days.

AFTER SECOND MOULT—Length $1\frac{30}{100}$ inch. ; very much as before ; whole surface one shade of yellow-green, except a dark dorsal stripe and a yellow ridge over the feet ; head nearly as before. Duration of this stage 14 days.

AFTER THIRD MOULT—Length $1\frac{15}{100}$ inch. Nearly as at last stage ; the head sub-globose, higher and narrower than before, well rounded at top, and broadest below : color of head emerald green, and covered as before with conical papillae. Duration of this stage 14 days.

AFTER FOURTH MOULT—Length $1\frac{5}{100}$ inch. ; greatest breadth $1\frac{5}{100}$ inch. This stage continued 28 days before chrysalis.

MATURE LARVA—Length 1.20 inch. ; greatest breadth $1\frac{15}{100}$ inch. Cylindrical, thickest in middle segments, the back well rounded, and sloping equally to either extremity ; ending in two sharp, conical tails, each placed at the extreme sides of the last segment ; color dull yellow-green, the sides a shade darker than dorsum ; a medio-dorsal dark green vascular stripe, and over the feet a yellow stripe or line ; tails reddish ; each segment creased about six times, and on the ridges so caused are many fine white papillae, each sending out a fine white hair, rendering the whole surface pubescent ; head sub-globose, a little larger than 2, frontally somewhat flattened, rounded at top, broader across the ocelli ; color emerald green, the surface covered with slightly paler conical papillae, pubescent.

CHRYSALIS—Length $1\frac{1}{100}$ inch. ; greatest breadth $1\frac{2}{100}$ inch. ; cylindrical, the abdomen evenly tapering : the wing cases a little raised at the margins ; headcase short, roundly excavated at sides, and rounded at top ; mesonotum slightly prominent, and followed by a small depression ; roundly carinated, the sides nearly flat, or very little rounded ; whole surface one shade of yellow green, covered with minute white granulations ; along the inner margins of wing cases a cream white line, another along keel of mesonotum, and one across top of head case. Duration of this stage 14 days.

LIST OF ACRIDIDÆ FOUND IN NEBRASKA.

BY LAWRENCE BRUNER, WEST POINT, NEBRASKA.

<i>Opomala carinata</i> , Thos.	<i>Ædipoda</i> (?) <i>venusta</i> , Stahl.
“ <i>aptera</i> , Scudd.	“ <i>sordida</i> , Burm.
“ <i>brachyptera</i> , Scudd.	“ <i>neglecta</i> , Thos.
“ <i>bivittata</i> , Serv.	“ <i>corallipes</i> , Haldiman.
“ <i>neo-mexicana</i> , Thos.	“ <i>aequalis</i> , Uhler.
“ <i>punctipennis</i> , Serv.	“ <i>collaris</i> , Scudd.
“ (?) <i>varipes</i> , Serv. ; at Omaha	“ <i>trifasciata</i> , Walker.
two years ago.	“ <i>cincta</i> , Thos.
<i>Chrysochraon viridis</i> , Thos.	“ <i>verruculata</i> , Scudd.
“ <i>punctulatum</i> , Thos.	“ <i>kiowa</i> , Thos.
“ <i>consersum</i> , Thos.	“ <i>picta</i> , Scudd.
<i>Stenobothrus admirabilis</i> , Uhler.	<i>Brachypeplus magnus</i> , Girard.
“ <i>brunneus</i> , Thos.	<i>Stauronotus elliotti</i> , Thos.
“ <i>aequalis</i> , Scudd.	<i>Boopedon nubilum</i> , Thos.
“ <i>propinquans</i> , Scudd.	“ <i>flavofasciatum</i> , Thos.
“ <i>curtipennis</i> , Scudd.	<i>Pezotettix picta</i> , Thos.
“ <i>gracilis</i> , Scudd.	“ <i>nebrascensis</i> , Thos.
“ <i>maculipennis</i> , Scudd.	“ <i>unicolor</i> , Thos.
<i>Gomphocerus clavatus</i> , Thos.	“ <i>Scudderi</i> , Uhler.
“ <i>simplex</i> , Scudd.	“ <i>borealis</i> , Scudder.
“ <i>euterpe</i> , G. M. Dodge.	“ <i>alba</i> , G. M. Dodge, n. sp.
<i>Stetheophyma gracilis</i> , Thos.	“ <i>junius</i> “ “
<i>Tragocephala viridifasciata</i> , Harris.	“ <i>autumnalis</i> “ “
“ <i>infuscata</i> , Harris.	“ <i>speciosa</i> , Scudd.
<i>Tomonotus sulphurea</i> , Sauss.	“ <i>gracilis</i> , Bruner, n. sp.
“ <i>xanthopterus</i> , Thos.	“ <i>occidentalis</i> , “ “
“ <i>carinatus</i> , Thos.	<i>Ommatolampis viridis</i> , Thos.
“ <i>tenebrosa</i> , Thos.	<i>Caloptenus bivittata</i> , Uhler.
<i>Ædipoda carolina</i> , Serv.	“ <i>differentialis</i> , Thos.
“ <i>nebrascensis</i> , Bruner.	“ <i>fasciatus</i> , Scudd.
“ <i>discoidea</i> , Serv.	“ <i>spretus</i> , Uhler.
“ <i>eucrata</i> , Uhler.	“ <i>femur-rubrum</i> , Burm.
“ <i>phoenicoptera</i> , Germ.	“ <i>griseus</i> , Thos.

Caloptenus (?) bilituratus, Walk.	Acridium alutaceum, Harr.
" lurida, G. M. Dodge.	" emarginatum.
" minor, Scudd.	Tropidacris dux, Scudd.
" punctulatus, Uhler.	Tettix ornata, Scudd.
" occidentalis, Thos.	" granulata, Scudd.
" regalis, Dodge, n. sp.	" cucullata, Scudd.
" volucris, (?).	" triangularis, Scudd.
" angustipennis, (?).	Tettigidea lateralis, Scudd.
Acridium americanum, Scudd.	" polymorpha, Scudd.
" ambiguum, Thos.	Batrachidea cristata, Scudd.

And in addition I have

3	species of	Pezotettix,	not yet	determined.
2	"	Caloptenus	"	"
2	"	Ædipoda	"	"

And 3 others of different genera not yet determined, making a total of 95 species for Nebraska thus far.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

BATRACHEDRA.

B. striolata ? Zell.

(*Asychna* ? *pulvella* Cham.)

In "The Bulletin of the Geo. Survey," v. 3, p. 134, I have referred to two species or varieties of *Batrachedra* found by me in Colorado. Some of these specimens found at Colorado Springs I referred doubtfully to the European species *B. præangusta*. Others found higher up the mountains I named *B. Clemensella*, stating, however, the doubt whether the two forms were really distinct. After the greater portion of that paper was in the hands of the publisher, I received from Mr. Stainton two specimens of *præangusta*, by which I was enabled to recognise my *B. Clemensella* as a variety simply of that species, and to increase my doubts whether the supposed species were really distinct; for while *Clemensella*

differed slightly from the true *præangusta* in being a little larger and darker, with a slightly different arrangement of the colors, my supposed *præangusta* differed still more from it in the opposite direction, being smaller, with less of the dark colors and also in a slightly different arrangement of them. The European specimens were between my supposed *præangusta* and my *Clemensella* from Colorado, but nearer to the latter. I have no hesitation in referring my *Clemensella* to the true *præangusta*, and I feel very strongly inclined to refer my supposed *præangusta* also to that species, notwithstanding that two out of six specimens of it agree closely with Zeller's description of *B. striolata*, described by him from Texas. I have not been able to recognise any of my specimens in Dr. Clemens' description of *B. salicipomonella*, though those that agree most nearly with the European *præangusta* agree also best with Dr. Clemens' description of *salicipomonella*. In his edition of the Clemens papers, Mr. Stainton, who had seen both *salicipomonella* and the European *præangusta*, says nothing about the question as to whether the forms are distinct, and gives Dr. Clemens' account of *salicipomonella* without comment. Nevertheless, from correspondence with him, I infer (perhaps unwarrantably) that he is not altogether convinced that they are distinct species.

In Vol. 8 of the CANADIAN ENTOMOLOGIST, p. 171, I have described under the name of *Asychna t. pulvella* (with the statement that it was not by any means a true *Asychna*) a species which was taken on willow trees in Kentucky, and which approaches nearly *B. striolata* Zell. and the form from Colorado which I first referred, as above stated, to *præangusta*. In these specimens the fore wings are sordid or yellowish white, dusted with fuscous, with a brown streak on the fold, another on the disc and a white spot at the end of the cell; another specimen taken in Kentucky since then has the streak on the fold and a brown spot at the end of the cell—none on the disc. My Kentucky specimens measure from $4\frac{1}{2}$ to 5 lines *alar ex.*; those from Colorado that I referred to *præangusta* (— *striolata* Zell.) measured 5 lines; Mr. Stainton gives $5\frac{1}{2}$ lines as the *alar ex.* of *salicipomonella*, and 7 as that of the true *præangusta*. Zeller gives — as that of *striolata*; and the specimens from Colorado which I named *Clemensella*, but now refer to *præangusta*, measured a little over 7 lines. I doubt greatly whether all are not referable to a single species, *præangusta*, or at most to only two, which are best represented by *præangusta* and *striolata*.

I was led into the error of referring the Kentucky specimens to *Asychna*? by getting hold of the wrong figures of the neururation—combining the neururation of *Bedellia somulentella* with the external characters of *Batrachedra*.

PERIMEDE.

P. erransella Cham.

In perfectly fresh specimens each of the four small tufts of raised scales on the fore wings is seen to be margined behind with white; there is a minute blackish spot at the extreme tip margined before with white, a minute white costal spot containing raised scales at the beginning of the ciliæ, and a row of minute white specks of raised scales around the base of the ciliæ. On the under side these spots are seen reversed, that is, the scales around the base of the ciliæ are whitish, and the specks dark brown; there is also a minute brown spot at the apex of the hind wings on the under surface. The tarsi are brown, prettily annulate with white.

The account given at p. 51, v. 6, of the neururation is slightly incorrect; there is (at least in some specimens) one more subcostal branch than is there stated, in the fore wings. The neururation of both wings is thus almost exactly that of *Laverna Staintoni*, as figured *Ins. Brit.*, v. 3. The wings are, however, a little more elongate and are narrower. It is closely allied to *Laverna*, but the palpi are nearly as slender as those of the figure of *Anybia langiella* (*Ins. Brit.*, v. 3), though much shorter—rather like those of *Chrysodista liniella* (*loc. cit.*) Its position in repose is singular for an insect so near to *Laverna*: the face is applied to the surface on which it rests, and the abdomen and wings elevated as it rests on the two anterior pairs of legs, with the third pair drawn up alongside the abdomen under the wings—more like an *Argyresthia* than a *Laverna*.

RAVAGES OF WHITE ANTS.—The Commissioner of Agriculture recently received from the Consul General at Monrovia, Liberia, a box of twelve books, principally United States public documents, that had been badly damaged by white ants, in several cases more than a third of the book having been destroyed entirely. The damage was done in the space of a few months while the Consul was absent. It is stated in the letter accompanying, that to preserve books and papers from the ravages of this insect, they must be kept free from dust and well exposed to the air.—*Field and Forest*.

INSECTS OF THE NORTHERN PARTS OF BRITISH AMERICA.

COMPILED BY REV. C. J. S. BETHUNE, M. A.

From Kirby's Fauna Boreali-Americana : Insecta.

(Continued from Vol. vii., p. 159.)

[254.] V.—HYMENOPTERA.

[257.] FAMILY SIRICIDÆ.

356. *SIREX JUVENCUS* Linn.—Length of body, mucro included, 11 lines; expansion of wings 20 lines. One specimen taken in Lat. 65°.

Body black-blue, glossy, punctured very thickly on the head and trunk, in which from each puncture proceeds a black hair. Head between globose and triangular, very hairy with a naked spot behind the eyes; cheek terminating in a tooth or point as in the other species of the genus; vertex blue-green; antennæ black, shorter than the thorax; palpi piceous; trunk subglobose, with the central part of the thorax and the part between the four anterior legs tinted with green; legs rufous with the coxæ and trochanters black; wings hyaline with piceous nervures; abdomen naked, terminated by a subtriangular acuminate mucro or horn; ovipositor piceous.

In this specimen the ovipositor is longer and goes further beyond the anal horn than in the European ones, and the horn itself is more dilated at the base.

[258.] FAMILY FÆNIDÆ.

357. *FÆNUS JACULATOR* Linn.—Two specimens taken in Lat. 65°.

The American specimens differ from those of Europe, which also vary, in having the red segments of the abdomen marked with a large black basilar dorsal spot, the former having mostly only a darker cloud. Panzer's figure, however, comes very near the American.

[It is doubtful that the European species occurs in America; they are probably distinct.]

FAMILY ICHNEUMONIDÆ.

358. *ICHNEUMON FERRUGATOR Kirby*.—Length of body 7 lines. Taken in the Expedition, but no locality stated.

[259.] Abdomen black, rather glossy, very thickly punctured with minute and often confluent punctures. Head transverse, triangular, not quite so wide as the middle of the trunk : anterior margin of the face rounded ; palpi reddish ; eyes long, subelliptical ; antennæ shorter than the trunk, spirally convoluted ; trunk oblong, subcompressed ; scutellum subtriangular, rounded at the apex ; metathorax armed on each side with a short tooth, with several elevated longitudinal and oblique lines ; legs with decumbent whitish hairs, anterior tibiæ obscurely, and all the tarsi, rufous ; wings embrowned with a rufous tint, nervures darker ; abdomen lineari-lanceolate, rufo-ferruginous, with the first joint, which is dilated at the apex, black ; footstalk channelled longitudinally on each side.

FAMILY CRYPTIDÆ.

359. *CRYPTUS VIDUATORIUS Fabr.*—Length of body, with ovipositor, $5\frac{1}{4}$ lines ; do, without ovipositor, $3\frac{1}{2}$ lines. One specimen taken in Lat. 54° .

Body black. Head subtriangular, transverse, very minutely and thickly punctured ; palpi pale rufous ; face plane with two elevations in the middle ; eyes large, oval ; antennæ shorter than the trunk, rather slender, involute, black with a white band in the middle ; orbit of the eyes behind with a very indistinct white line ; trunk oblong, cubical, gibbous, very thickly and confluent punctured except on the back ; tegulæ white ; metathorax armed with two minute teeth on each side, one in the middle and the other at the base, forming the terminal angle, marked out into three areas by elevated lines ; legs red with coxæ, trochanters, and posterior tarsi black ; wings subtestaceous with the larger nervures black ; abdomen, excluding the ovipositor, scarcely so long as the trunk ; first segment impunctured, glossy, dilated at the apex, which is subquad-rangular ; footstalk flat ; second and third segments very large, with their gloss obscured by infinitely minute punctures ; ovipositor shorter than the abdomen ; borer red.

[260.] GENUS CRYPTOCENTRUM.

Head between transverse and globose ; face quadrangular, with the anterior margin crenate ; palpi long, filiform ; antennae slender, first joint thick ; second minute ; third longer than the rest ; trunk ovate-oblong, subcompressed ; neck moderately long ; scutellum trapezoidal ; legs slender, posterior pair elongated ; upper wings-apical areolets three ; middle four, viz., 2, 2, without a cellule ; basilar three ; under wings—areolets seven, viz., 4, 3 ; abdomen sessile, smooth, subcompressed, in the female clubbed at the apex : four first segments longer than the rest, the first curved, rather wider at the apex ; the three next are wider than long, the last is minute and triangular ; at the extremity the tail is cleft for the passage of the ovipositor ; this cleft is formed by the turning up of the sides of the last ventral segment ; ovipositor very short ; the four last ventral segments, at least in the dead insect, project so as to form an elevated ridge in which the ovipositor is concealed.

360. CRYPTOCENTRUM LINEOLATUM *Kirby*.—Plate vi., fig. 1.—Length of body 6 lines. A single specimen taken in Lat. 65°.

Body very black, somewhat glossy, sprinkled with whitish decumbent hairs. Head subtransverse, hollowed out behind to receive the neck ; face with a streak on each side the eyes ; feelers and scape of the antennae on the outside white ; antennae slender, black, externally obscurely testaceous, with a white annulet below the middle ; trunk compressed ; margin of the collar on each side, tegulae, and two transverse elevated streaks on the scutellum, white ; four anterior legs with the coxae and trochanters, tip of the thigh and under side of the tibiae, white ; the thighs, except the tip, testaceous ; upper side of the tibiae and tarsi, and long posterior legs, black ; wings hyaline with black nervures ; abdomen sessile, with the last segments dilated for the reception of the ovipositor ; the apical margin of all the segments but the two first is interruptedly white ; but in those segments the interruption is not perfect.

[261.] FAMILY BRACONIDÆ.

361. BRACON CROCATOR *Kirby*.—Length of body without ovipositor 3 lines. A single specimen taken in Lat. 65°.

Body very black, glossy. Head subglobose, with the segment of a circle taken out behind ; eyes between oval and round ; antennae as long

as the trunk ; trunk oblong, widest between the wings ; scutellum rather large, rounded at the apex ; metathorax obsoletely transversely wrinkled, sloping towards the abdomen ; posterior legs rather robust ; wings embrowned, middle areolets four, viz., 3 and 1, all quadrangular ; stigma very large ; abdomen lanceolate-ovate, as long as the trunk, saffron coloured, paler towards the apex ; the three first segments are emarginate, and marked with two longitudinal faint furrows, the first pair being curvilinear ; ovipositor longer than the body, borer red.

FAMILY FORMICIDÆ.

[262.] 362. *FORMICA SEMIPUNCTATA Kirby*.—Length of body $7\frac{3}{4}$ lines. Several taken in Journey from New York to Cumberland-house.

Body black, glossy. Head something wider than the trunk, subtriangular ; antennæ piceous with the scape black ; wings cast in all the specimens ; scale vertical between the trunk and abdomen, sloping to a thin edge upwards, where it is very slightly emarginate ; abdomen oblong, subcylindrical, minutely punctured with the punctures piliferous ; hairs decumbent with those of the margin of the segments and the anus, longer ; margin of both abdominal and ventral segments membranous, membrane reddish ; base of the three intermediate segments not punctured.

363. *FORMICA FUSCA Linn.*—Length of body $1\frac{1}{4}$ line. One specimen taken in Lat. 65° .

[263.] ♀.—Body black, but not intensely, glossy, subcinereous from down. Head triangular, large, much wider than the trunk ; antennæ with the scape, the three following joints, and the terminal one, rufous ; the other joints are darker ; trunk oblong, compressed, anteriorly elevated and wider ; the prothorax with the scutellum forming a rhomboid ; scutellum large, trapezoidal, subrufous ; scale subtriangular, subemarginate ; legs rufous ; thighs embrowned ; abdomen subglobose, more hairy than the rest of the body, especially towards the anus.

FAMILY VESPIDÆ.

364. *VESPA VULGARIS Linn.*—Length of body $6\frac{1}{2}$ lines. A single specimen taken in Lat. 65° .

[264.] ♀.—Body black, variegated with yellow. Head and trunk thickly clothed with long woolly down of a grayish colour; face with three yellow spots placed in a transverse line behind the antennae, the two lateral ones subtriangular, the intermediate one subquadrangular, with a reddish cloud on its disk; the nose below the antennae is yellow, inclining to red round the margin; it has also three black dots placed in a triangle in the disk, the two lower ones being very minute; the vertex of the nose is also black; the mandibles are yellow with black tips; on the outside the orbit of the eyes is reddish-yellow; the trunk is black underneath; above the posterior upper margin of the collar, the tegulae which cover the base of the wings, and a triangular spot underneath them, are yellow; on the metathorax and scutellum are six yellow spots placed in a double series, the upper and lower pairs being subtriangular, and the intermediate pair crescent-shaped; the thighs are black at the base, but their apex, and the rest of the leg, and a small triangular spot on the inner side of the four posterior trochanters, are yellow; the wings are yellowish red with red nervures; the abdomen, except at the base, is less hairy than the rest of the body; it is yellow with all the segments black at the base: though the blackness in the terminal ones is chiefly concealed by the antecedent segments; in all in the middle it projects into a triangle; the four intermediate ones have also each a round-headed small black spot, the connection of which with the blackness of the base is interrupted in the second segment; on the under side of the abdomen the base of the segments is black, and the intermediate ones have each a pair of rather crescent-shaped black spots not connected with the blackness of the base.

[Kirby states that the specimen above described differs somewhat from the European wasps of this species, but he considers it to be merely a variety of the latter. Later authors state that both *V. vulgaris* and *V. germanica*, European species, are found on this side of the Atlantic.]

365. *VESPA BOREALIS* Kirby.—Length of body $7\frac{1}{2}$ lines. A single specimen taken with the last.

[265.] Body black, downy, especially the head and trunk, with gray hairs. Nose trapezoidal, yellow with a black floriform discoidal spot; anterior margin with three sinuses taken out; vertex with a trapezoidal yellow spot just above the base of the antennae; antennae black, luteous

underneath : external orbit of the eyes and mandibles yellow ; lateral margin of the collar, a triangular small spot under each wing, two narrow transverse and internally acute spots on the scutellum, and two similar ones below them on the metathorax, all white ; tegulæ white with a brownish spot in the disk ; legs yellow ; thighs black at the base ; wings testaceous ; abdomen heart-shaped, with the bases of the segments where uncovered, and two dots on each except the first, black ; the middle part of the black basal bands projects into a triangular tooth ; the under side is nearly similar, but the projections form a longitudinal stripe.

366. *VESPA MARGINATA Kirby*.—Plate vi., fig. 2.—Length of body $7\frac{1}{2}$ lines. Taken in the route from New York, and again in Lat. 65° .

♀.—Body black, punctured, downy from a mixture of black and gray hairs. Mandibles white with a black margin ; palpi reddish ; nose white with a flask-shaped longitudinal black spot in the disk ; just above the antennae is a bilobed white spot, between which and the eye is a white line, and another external one above it ; antennae short, not much exceeding the head, black with the scape white underneath : in one of the specimens there is a reddish spot underneath on the four or five last joints, which is not discernible in the others ; the external margin of the collar, before each wing, and a small triangular spot on each side of the scutellum, are white ; wings embrowned with darker nervures, but the costal nervure and tegulæ are ferruginous ; legs testaceous, black at the base ; abdomen with the apex of the dorsal and ventral segments white ; anal segment black with a pair of white spots ; the white margin of the dorsal segments receives an intermediate triangular point, and on each side of it a rounded lobe from the black base.

[266.] 367. *VESPA MACULATA Linn.*—Length of body 10 lines. A single specimen taken in Lat. 65° .

[As this insect, commonly known as the "White-faced Hornet," is so abundant in Canada, and has been so often described, it is unnecessary to quote Kirby's description.]

FAMILY PROSOPIDÆ.

368. *PROSOPIS ELLIPTICA Kirby*.—Length of body 3 lines. Three specimens taken in Lat. 65° .

[267.] Body very black, slightly downy, minutely punctured. Apex of the nose white, whiteness lobed; inner orbit of the eyes below the antennae white; vertex channelled below the eyelets; antennae scarcely longer than the head; the projecting lobes of the collar terminate in a white tubercle; base-covers piceous; wings hyaline with dark nervures; metathorax longitudinally wrinkled; posterior tibiae annulated at the base with white; abdomen more glossy than the rest of the body, almost naked, and scarcely punctured; it is narrower and more elliptical than in any other known species of the genus.

[This species and another, *P. affinis* Smith, are found in Canada.]

FAMILY ANDRENIDÆ.

369. *HALICTUS RUBICUNDUS* *Stephens*.—Length of body 5 lines. Four specimens taken, locality not stated.

♀.—Body black, downy. Head suborbicular, down grayish; space between the eyes broad; down on the thorax thicker, ferruginous; base-covers rufo-piceous; wings subhyaline; nervures and stigma testaceous; post-costal nervure black; legs thickly set with yellow hairs which shine like gold; tarsi testaceous; abdomen elliptical, downy with decumbent hairs; margin of the segments fringed with white hairs, the two first sub-interruptedly; the ventral segments are similarly fringed, but the hairs are shorter.

370. *HALICTUS CRASSICORNIS* *Kirby*.—Length of body 3 lines. A single specimen taken in Lat. 54°.

[268.] ♀.—This little insect is so extremely like *Halictus lævis*, that at first I regarded it merely as a variety of that species, but upon a closer inspection they appear to me distinct. In *H. crassicornis* the antennae are proportionally more robust, but the principal difference lies in the sculpture of the thorax. In *H. lævis* that part is *visibly* punctured with scattered punctures, but in the insect I am describing, under a common lens, the punctures are scarcely discernible, but under a higher power, besides a slight channel drawn longitudinally, innumerable very minute punctures appear. In the former also the stigma of the upper wings is piceous, while in the latter it is testaceous. In other respects they are perfectly similar.

371. *ANDRENA IMPUNCTA* *Kirby*.—Length of body 5½ lines. A

single specimen taken in the Journey from New York to Cumberland-house.

♀.—Body black, clothed with rather long whitish hairs, especially the face below the antennae; hairs of the thorax rufescent; wings subhyaline a little darker at the tip; nervures testaceous, post-costal black; brush of the posterior tibia white; abdomen impunctured with the hairs of its anterior half white; the other hairs above and below black.

372. *ANDRENA VARIANS* Ross.—Length of body $5\frac{1}{2}$ lines. Three specimens taken, locality not stated.

[269.] ♀.—Very like the species just described, but the head is clothed with black hair; that of the thorax and base of the abdomen is tawny-red; the brush of the posterior tibia is changeable, as the site varies, from black to white; the hairs of the under side of the body and of the last abdominal segment above are black, except those on the posterior thighs forming the flocculus, which are whitish, as are those of the anterior part of the abdomen.

FAMILY NOMADIDÆ.

373. *NOMADA AMERICANA* Kirby.—Plate vi., fig. 3.—Length of body $4\frac{1}{2}$ lines. A single specimen taken in Lat. 65° .

Body dark-ferruginous. Thorax with a longitudinal mesal black line, less distinct on the metathorax; breast with a black spot on each side; wings, as in the rest of the genus, embrowned with a white spot near the tip; thighs black at the base on the under side; first segment of the abdomen black at the base, and, with the second and third, brown at the apex.

This is the only American *Nomada* I ever saw, and Fabricius describes none from that country. It comes near *Nomada ruficornis* and *striata*, but it has only a single black stripe on the thorax.

[Dr. Packard states that these Cuckoo-bees, the *Nomada*, are very numerous in America.]

[270.] FAMILY CHELOSTOMIDÆ.

374. *CHELOSTOMA ALBIFRONS* Kirby.—Length of body $4\frac{1}{2}$ lines. A single specimen taken in Lat. 65° .

♂.—Body black, thickly punctured. Mouth bearded with white; mandibles carinated above, armed with two strong terminal teeth; nose square, flat, clothed with decumbent silver pile; antennæ filiform: scape black; the other joints are rufo-piceous underneath; trunk very hirsute with white or subcinereous hairs; wings a little embrowned, with black veins and base-covers; legs hairy; abdomen subcylindrical, hirsute with black hairs, incurved with the apex of the four intermediate segments fringed with white hairs; anal joint with a concavity above, obtuse; last ventral segment forcipate, rufo-piceous

NEW SPECIES OF LEPIDOPTERA.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Scopelosoma tristigmata, n. s.

This form, or species, belongs to the series of *Walkeri* and *vinulenta*, of the former of which I was at first disposed to consider it a variety. It is distinguished by the presence of all three of the ordinary spots. Rusty ochre; t. a. line single, even, blackish with the small rusty outlined clavi-form attached. Orbicular rusty-ringed, with pale centre, small. Reniform pale ochre, rusty-ringed, well sized, of the ordinary shape, with a black inferior stain. Median shade a little waved, joining the reniform above and issuing from it inferiorly. T. p. line much as in *Walkeri*, with the three black streaks on the median nervules unusually distinct. S. t. line margined before with a fuscous shade, pale, irregular; terminal space contrasting, fuscous, with the veins black-marked. Fringes ochreous. Hind wings blackish fuscous, with ochrey fringe. Head and thorax rusty ochre; antennæ paler at base; abdomen fuscous, rusty ochre at sides and tip and beneath. Wings ochreous beneath, with common shade band, flexed on hind wings, which show a discal mark. Expanse 35 mil. Newtonville, Mass., No. 8, April 23, Mr. Roland Thaxter.

Terache abdominalis, n. s.

This species is parallel with *aprica* and may be distinguished by the blackish abdomen, ringed with white. It varies in the color of primaries and thorax. In some specimens the fore wings are white from the base to exterior line with two dark costal patches as in the type *aprica*. The exterior line is heavier and more metallic than in *aprica*. The subterminal line is notably less inwardly projected than in *aprica* below the median nervules. Again, the fore wings are more or less blackish at base, leaving two white costal blotches as in *biplaga*. Beneath the two forms are to be quickly distinguished. In *abdominalis* the wings are yellowish, the hind wings with a terminal blackish band, two discal longitudinal rays from the base and a transverse fascia broadly marked on costa in the best marked specimens; the rays and transverse fascia become more or less obsolete. Above the hind wings are black or blackish, sometimes pale yellowish on disc, always darker than in *aprica*. Thorax and head blackish; tegulae more or less white on the sides. Expanse 25 mil. Hab. Texas (Belfrage No. 596); also collected by Heiligbrodt, in Mr. Meske's collection. The colors of the dark outer portion of the fore wings are brighter than in *aprica*, the band before t. p. line more olivaceous, the subterminal line more tinged with brown. I have to thank Mr. v. Meske for drawing my attention to this form, which from the description cannot be *obatra* of Mr. Morrison.

Geometra rectaria, n. s.

♂. This species is smaller than *iridaria*, of a rather more dull green and with one-half narrower white lines. Costa of primaries whitish, much marbled with fuscous. Inner white line of primaries perfectly *straight*. Outer line extending across hind wings in same position as in *iridaria*. Minute black discal points on both wings. Fringes concolorous, not paler as in *iridaria*. Head white; palpi brown at tips. Legs white with black dots at extremities of second and third joints. Beneath secondaries a little paler than primaries, on which alone the minute black discal points are legible. The common exterior line is indistinctly shown. Tegulae and collar green; dorsum of thorax discolorous. Expanse 25 mil. Hab. Texas (Belfrage, No. 323).

This species differs from Mr. Walker's descriptions of forms unidentified by Dr. Packard more broadly than from *iridaria*. The wings and body are proportioned as in *iridaria*. From the description I should not refer

Geometra mimicata Walk. to this genus. *G. rectaria* may be included by Dr. Packard among his Texan material of *iridaria*, but I do not think it is the same ; the green fringes seem shorter, the narrow lines, the inner one on primaries perfectly straight and the more brown and inconspicuous costal edging are as strong as specific characters seem to be in this group. The dot on hind wings beneath is obsolete ; there are no white markings on the veins.

ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The annual meeting of this Club will be held at Nashville, Tenn., on Tuesday, the 28th of August, at 3 p. m. The regular meetings of the Association will commence on the following day. The pleasures connected with the annual re-union of Entomologists during the meetings of the Club will, we doubt not, attract to Nashville many of the "brethren of the net." The citizens of Nashville are offering private hospitality to all the members of the Association who will accept it, and have also made arrangements for hotel accommodations and railway tickets at reduced rates. We hope to hear of a large attendance.

CLISIOCAMPA SYLVATICA — THE FOREST TENT CATERPILLAR.

BY THE EDITOR.

The larvæ of this moth (see fig. 6) have been enormously abundant this season in the vicinity of London, Ontario. Vast swarms numbering millions upon millions consumed the foliage of fruit and forest trees during

the latter part of May and the early weeks of June. By the 5th of the latter month they had become about two-thirds grown, when the daily consumption of foliage was so immense that their presence attracted general attention and the most vigorous onslaughts were made on them from all sides. But notwithstanding they were slain every day by

Fig. 6.



millions, their numbers seemed scarcely to diminish. In many places the forests by the middle of June were so completely denuded that they afforded but little more shade than in mid-winter, trees of all kinds suffering severely. They attacked the oak, ash, basswood, maple, thorn, cherry, beech and hickory, as well as almost all sorts of fruit and ornamental trees, and during June their activity in travelling from place to place was so incessant that the most constant vigilance was required to save favorite trees from destruction. Their habit of congregating in large masses on the trunks of the trees they fed on in the mornings rendered their partial destruction comparatively easy; had it not been

for this scarcely a leaf would have been left on any of the trees named in the whole neighborhood.

When the larvæ began to change to chrysalids they sewed up the remaining fragments of the few leaves still unconsumed on the trees into all kinds of curious shapes, each enclosure frequently protecting two or three cocoons. These cases hanging pendant with the weight of their contents, and with the paler under surfaces of the leaves displayed, looked in many instances as if a crop of some strange fruit was maturing. On gathering a number of the chrysalids, a very large proportion of them were found infested with parasites, chiefly dipterous, with occasional examples of the hymenopterous order.

Early in July the evenings were enlivened by large numbers of the moths which flew vigorously about in lighted rooms, thumping against everything in their erratic and apparently aimless flight. In a few days their egg masses were to be seen in considerable numbers on the branches of fruit and forest trees, where they will remain, unless otherwise destroyed, until the period of their hatching next spring.

MISCELLANEOUS.

PAPILIO THOAS.—On the 1st and 2nd of August, I had the pleasure of capturing in a field near Amherstburg, Ontario, eleven specimens of *Papilio thoas*, most of them in good condition, besides a number of other species of butterflies. The specimens of *thoas* were all taken on the flowers of thistles.—J. M. DENTON, London.

CISTHENE SUBJECTA.—Early in July the writer captured two specimens of this elegant little moth, generally very rare here, on the blossoms of Milkweed (*Asclepias cornuti*). Their legs had been caught in the sticky substance which exudes from the sides of the flowers, and thus they were held firmly.—ED. C. E.

MELITAEA PHAETON.—For two or three years past I have searched in vain throughout this locality for *M. phaeton*, but this season I have taken all that I wanted; indeed, they were so abundant that at one time I might have taken a hundred in a few hours had I wished to do so. I have taken also a specimen of *Myrmeleon obsoletus* Say, and one of *Psycomorpha epimenis* Drury, both rare in this neighborhood.—J. ELWYN BATES, South Abington, Mass.

AMBLICHYLA CYLINDRIFORMIS.—We are indebted to our friend, Mr. S. W. Williston, of New Haven, Conn., for a very fine specimen of this hitherto rare insect, which reached us by mail from Kansas in excellent condition. On opening the small tin box in which it had been confined, it seemed as healthy and vigorous as possible, moving briskly around in its endeavors to escape. It is a very handsome creature, and will prove a most acceptable addition to our cabinet.—ED. C. E.

FOOD PLANT OF S. CECROPIA.—We have taken the larvæ of *cecropia* this year feeding on the European Alder; they were nearly full grown, and the amount of foliage consumed on the young trees left little doubt that the eggs had been laid and the larvæ matured entirely on these trees.—ED. C. E.

I have taken at sugar this season *Sphinx Kalmie* and *myron*.

Is it not unusual to see *Catocala*s about in day time? Recently I took *C. subnata* feeding on the edge of a swill barrel at mid-day—the barrel standing in the shade, however.—W. L. DEVEREAUX, Clyde, N. Y.

AMBLYCHILA CYLINDRIFORMIS

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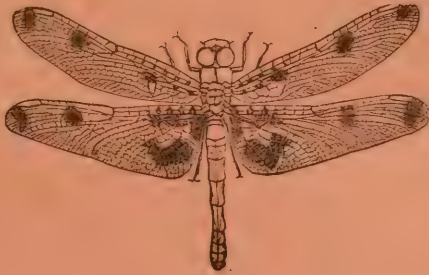
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No. 9

A NEW LEPIDOPTEROUS INSECT INJURIOUS TO VEGETATION.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

(Read before the Am. Asso. Adv. Sci., August 30, 1877.)

In the months of June and July the Red Pine (*Pinus resinosa*) and the White Pine (*Pinus strobus*) show by the exuding pitch that they are suffering from the attacks of an insect. The wounds occur on the main stem below the insertion of the branch. On cutting into the bark the injury is found to be caused by a small larva, which, when full grown, measures 16 to 18 millimetres. The head is shining chestnut brown with black mandibles. The body is livid or blackish green, naked, with series of black dots, each dot giving rise to a single, rather stout, bristle. The prothoracic shield is blackish. The larva has three pair of thoracic or true jointed feet, and four abdominal or false feet, besides anal claspers. This larva, eating on the inner side of the bark, and making furrows in the wood, causes the bleeding which, when the depletion is excessive or continuous, and especially in the case of young trees, has proved fatal.

In July the worm spins a whitish, thin, papery cocoon in the mass of exuding pitch, which seems to act as a protection to both the larva and the chrysalis. The chrysalis contained in the cocoon is cylindrical, smooth, narrow, blackish-brown, about 16 millimeters in length. The head is pointed, there being a pronounced clypeal protuberance; the segments are unarmed; the anal plate is provided with a row of four spines, and two others, more slender, on either side of the mesial line, below the first. It gives the moth in ten to fourteen days. The perfect

insect expands on an average 30 millimeters. An examination of the veins of the wing shows that vein 7 of the primaries is wanting, while vein 1 is simple. On the hind wing the cell is closed or very nearly so. It belongs thus to the *Phycidæ*, a sub-family of the *Pyrallidæ*. The male antennæ are bent a little at the base, the joints inconspicuous; the maxillary palpi in the same sex are not brush-like, and the hind wings are 8 and not 7-veined. We may refer the moth, then, to the genus *Nephopteryx*. Veins 3, 4 and 5 spring nearly together from the outer extremity of cell of the hind wings (though 5 seems to be nearly independent while running close to 4); vein 2 is not far removed from 3. On the primaries veins 4 and 5 spring from a common stalk, so that we must refer the moth to the sub-genus *Dioryctria* of Zeller. In color the moth is blackish gray, shaded with reddish on the basal and terminal fields of the fore wings. There are patches or lines of *raised* scales on the basal field and on the anterior and darker portion of the medium space. The median lines are prominent, consisting of double black lines enclosing pale bands. The inner line at basal third is perpendicular, W-shaped or dentate. The outer line at apical fourth is once more strongly indented below costa. The black component lines do not seem to be more distinct on one side than on the other of the pale included bands or spaces. The median field is blackish, becoming pale towards the outer line; it shows a pale, sometimes whitish cellular spot, surmounted with raised scales. It can be seen that these raised scales (easily lost in setting the insect) accompany the median lines as well as forming the discal mark and the linear patch on the basal field. The terminal edge of the wing is again pale or ruddy before the terminal black line. The fringes are blackish. The hind wings are pale yellowish white, shaded with fuscous on costal region and more or less terminally before the blackish terminal black line: the fringes are dusky. Beneath the fore wings are blackish, marked with pale on costa; hind wings as on upper surface. Body blackish gray, with often a reddish cast on thorax above and on the vertex. The eyes are naked, the labial palpi long, ascending, with moderate terminal joint. Tongue rather long. The gray abdomen is annulated with dirty white, the legs are pale dotted. The species differs from the European *abietella* by the raised scale tufts on the wings, and Prof. P. C. Zeller, who has kindly compared examples for me, declares it to be quite distinct from any European species. The pupa seems to differ from that of *abietella* by the clypeal prominence, which appears entirely absent in the European

species, judging from Ratzburg's excellent figures. The larva is found to attack also various imported conifers : for this reason I supposed it might be an imported parasite. It has been noticed on the Scotch, Austrian and Russian Pine, and it will be found, I fear, a grave enemy to the cultivation of this genus of plants.

Since the insect is not noticed yet in any scientific publication, I propose to name it *Nephoptyx (Dioryctria) Zimmermani*, after Charles D. Zimmerman, of Buffalo, who has made many excellent observations on our noxious insects, and to whom I am greatly indebted for help in getting the present facts with relation to the species. He has kindly spent much time in climbing large trees and cutting out pupæ and larvæ and rearing the perfect insect.

The larva of *abietella* is described by Ratzburg as living in the cones chiefly of various species of *Pinus*. Nevertheless, he speaks of one instance in which it is found under similar circumstances to those which are usual with *Zimmermani*, which latter I have not yet noticed attacking the fruit. The European species is said to winter in pupa state. In the vicinity of Buffalo our species seems to be single brooded. I have not yet ascertained the winter state. Ratzburg recommends cutting off infested branches, but especially on small trees. I find the larva of *Zimmermani* usually infesting the *main* stem at the insertion of the branches. From the fact that the pitch of the trees offer a protection, I do not think that any washes would reach the insect. The knife, then, seems the only remedy.

Our species has a natural enemy in a small hymenopterous parasite with which I have found certain of the chrysalids to be filled.

ON THE HABITS OF AMBLYCHILA CYLINDRIFORMIS.

BY S. W. WILLISTON, NEW HAVEN, CONN.

The great interest in which this beetle has been held by Entomologists for so long has rendered an accurate account of its habits very desirable ; but for a very long period—over twenty years—it has singularly eluded more experienced observers. In the Proceedings of the

Kansas Academy of Science for 1876, a slight account was published by Mr. H. A. Brous, but from the very small number taken by him, his article was necessarily imperfect. I have taken more than five hundred living specimens from the plains of Western Kansas during the past two years, and have watched their habits closely. Without being aware of Dr. LeConte's suggestion as to their nocturnal habits, one would readily arrive at that conclusion from the large numbers of their remains constantly met with scattered about, or in the excrement of nocturnal birds. With the first living specimen their peculiar habitat was readily understood. They may be met with in great abundance on gently sloping banks of firm loam, but partially covered with vegetation; they will not live in banks at all sandy. They never burrow, but enter any convenient hole at the approach of the sun, to come out again and wander in search of food at sunset. In cloudy days they will remain out, but with the first sunlight they disappear into their retreats, not to return until evening. The first one taken this year was on a pleasant evening in May, the 21st; but, though hunted for assiduously, no more were taken till near the middle of June. In a week or two later they were found in the greatest abundance.

The males, at first numerous, invariably soon begin to decrease in number, and are more abundant early in the evening. By the middle of September the females also have become rare.

The eggs are deposited near the surface of the ground, in groups of from one to two dozen. The young larvæ immediately burrow downwards, but come to the surface at dark to lie in wait for food, which consists mostly of ants and small insects. The holes are extended to surprising depths. In some instances I have traced them for nearly three feet. The mature larvæ are over two inches long, with very strong mandibles and maxillæ. They may be found most readily either in May or August. Singularly unlike the imago, they are very shy and easily alarmed.

The adult beetle might very appropriately be called stupid. Their power of sight is *extremely* feeble. Wandering aimlessly about in search of food, they are first apprised of their prey by their antennæ, when by a short, sudden spring they fasten their relentless mandibles into their victim.

Their food consists in large part of the smaller apterous Tenebrionidæ, such as the *Eleodes* or *Aside* that are found on the plains in such abundance, especially during the time and in the places so peculiar to the

Amblychila. Such Orthoptera as they are able to seize, they eat with the greatest avidity, but it is *very* rarely that they are able to catch any but the slow moving walking-sticks. They also devour a great many ants. They never feed on effete or decayed matter.

A dozen or more, when confined in a small space, will rarely injure one another, but are readily kept captive, eating any fresh animal food and even thriving on fresh meat. Their appetite is by no means small! They never heed an observer or collector till touched.

The males in the great majority of cases are larger than the females and may be readily distinguished by the sharp-pointed trochanters of the hind coxæ.

DESCRIPTION OF THE PREPARATORY STAGES OF PHYCIODES HARRISII, SCUDDER.

BY W. H. EDWARDS, COALBURGH, W. VA.

I received, 25th June, from Mr. C. P. Whitney, New Milford, N. H., a cluster of about 50 eggs of this species, laid on the under side of a leaf of *Diplopappus umbellatus*, date of deposition not stated. The larvæ hatched 28th June. The food plant not being obtainable by me, I gave them leaves of *Chelone glabra*, on which *phaeton* feeds, but so long as the least bit of the dry leaf of *Diplopappus* on which they hatched remained, the larvæ declined the *Chelone*, and then after starving many hours they attacked it vigorously. But, meantime, for want of proper food, several died. They manifested alarm just as do the larvæ of *nycteis* and *phaeton*, by a jerking motion of the body from side to side, the last segments being fixed to the leaf, and all the larvæ jerking together. This is contrary to the habit of *tharos* so far as observed, nor have I seen it in other species. On 2nd July the first moult was passed, and the larvae now utterly refused *Chelone*, although gnawing the edges of a bit of white paper in their hunger. I gave them *Aster* and on this they fed readily to the last, eating any species indifferently. On 7th July they were passing second moult, and on 12th and 13th, the third moult. Shortly after this

they stopped feeding and gathered in a cluster on the cover of the glass in which they were kept, and became lethargic. Their behavior throughout was like the larvæ of *nycteïs*, though they are cleaner in feeding than that species, which keeps itself in a mire on the leaf. No web at any stage was spun for protection or other purpose, and they are hybernating now on a slight mat of silk made upon the cover of the glass.

Earlier this year, May 24th, I received from Mr. Whitney about a dozen larvæ of this species, found by him soon after awaking from their hybernation. These were of all stages from just after second moult to the fifth, or the mature larva, and one made chrysalis 26th May. From this the butterfly emerged 4th June. Evidently these larvæ hybernate after both second and third moult, as do those of *phaeton* and *nycteïs* and *tharos*, though all which I now have in hybernation (16 in number) have passed the third. In all stages the larvæ resemble closely those of *phaeton*, changing from ochraceous, lighter or darker, to deep fulvous, and striped with black. So the spines and their branches are those of *phaeton*, and differ much from *nycteïs*, as the coloration of the body differs. The egg also is nearer *phaeton* than *nycteïs*, but the sides are more sloping and less rounded, and the ribs spring from the base instead of the middle of the side. The chrysalis is shaped like that of *tharos*, and colored like that of *phaeton*. There is much variation in the coloration in individuals. One of the larvæ was nearly black at maturity, the fulvous being represented merely by a few dots and small spots. The butterfly from this larva is very melanic on both sides, in as strong contrast to the rest of the brood as was the larva. The species is single brooded, like *phaeton*, while *nycteïs* is double brooded in W. Va., and *tharos* many brooded.

EGG—In shape a frustum of a cone, flattened at base, the top a little depressed, the sides but little rounded, ribbed, the ribs standing well apart, 15 or 16 in number, and starting from the base, increasing in elevation above the surface as they approach the middle, then decreasing to the summit; color lemon yellow.

YOUNG LARVA—Length $1\frac{5}{16}$ inch. ; cylindrical, the segments well rounded; color yellow-green, semi-translucent; somewhat pilose; head obovoid, bilobed, the vertices rounded; larger than second segment; color dark brown.

AFTER FIRST MOULT—Length $1\frac{3}{8}$ inch.; thicker in middle segments: armed with seven rows of short black spines, thick at base,

tapering, and thickly set with short black bristles; there is also a row of small, similar branching spines over the feet; color yellow brown, the second segment quite dark, and on this is a collar of minute branching spines; there is also a dark medio-dorsal line; head obovoid, rather flattened frontally, the vertices rounded; color black brown, with many black hairs.

AFTER SECOND MOULT—Length $\frac{3}{16}$ inch.; shape and spines as before; color ochre-yellow, with five transverse black lines on the segments, and a dark medio-dorsal line; head as before, black.

AFTER THIRD MOULT—Length $\frac{7}{16}$ inch.; spines and bristles larger in proportion; color deeper ochre, striped as before.

AFTER FOURTH MOULT—Length $\frac{4.6}{100}$ inch.; color red, or orange ochraceous; the transverse lines distinct, and edged unevenly, one before each row of spines and two after; at base of body, on feet, an ochrey ridge; the spines short and stout, with very divergent bristles; head as before, the surface finely tuberculated, black.

AFTER FIFTH MOULT—Length $\frac{10}{100}$ inch., increasing to $\frac{11}{100}$, and in one example to one inch at maturity.

MATURE LARVA—Cylindrical, of nearly even diameter throughout; color deep red fulvous, crossed by black stripes, one before and two after each transverse row of spines, and with a medio-dorsal black longitudinal stripe; the last two segments nearly all black, and on 9 to 11 the fulvous bands are macular; the spines on each segment also stand on a broad black band; spines in seven principal rows, one dorsal, three lateral on either side, long, tapering, black, each thickly set with long divergent black hairs, and each rising from a broad, round, shining black, or blue black base; over the feet a similar row of small spines; the second segment with a collar of small branching spines; feet and prolegs black; head obovoid, flattened frontally, cleft, the vertices rather pointed than rounded, black, granulated, and with many short black hairs.

CHRYsalis—Length $\frac{3}{16}$ inch.; cylindrical; head case compressed transversely, nearly square at top, bevelled at the sides; mesonotum rounded, not prominent, followed by a slight depression; abdomen stout, with several rows of small sub-conic tubercles, two of which are extended to upper side of mesonotum; color pure white, marked and spotted throughout with black, or brown black, and orange, and showing much variation in individuals; the last segments black; a broad band of black

on the ventral side reaches from the head case to lower end of wing cases, and the abdomen has orange bands between the segments ; on the wing case a curved black band crosses longitudinally, and in this the nervules of the wing are orange ; there is also a row of black dots or small spots about the hind margin ; the tubercles orange, and nearly all have a black crescent on the anterior side ; on the posterior side of the abdominal segments are also small black spots. The coloration varies much, and some examples are almost deprived of the black markings, while retaining the orange.

NOTES ON CATOCALÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Catocala junctura Walk.

Dr. Bailey has taken near Albany a little larger form than *unijuga*, with rather paler primaries and much the same markings. The hind wings are a little more pinkish, without the dusky basal hairs of *unijuga*. The band is a little narrower than in *unijuga* and terminates much before the internal margin. It tallies with my recollection of Walker's type of *junctura* in the British Museum, and I am disposed to think that *junctura* is now rediscovered.

Catocala Anna Grote.

Mr. Thos. E. Bean has taken this species in Illinois. It varies slightly in the terminal band being sometimes entirely broken before anal angle.

Catocala Frederici Grote.

This species, described by me from types in the Royal Museum at Berlin, taken by Friedrichs in Southern Texas, has now been rediscovered by Belfrage in Bosque Co. Mr. Belfrage sends me a specimen under the number "672," taken on pine, which agrees perfectly with the original description and with a water-color drawing made from the Berlin speci-

mens by Tieffenbach, and sent me by the late Prof. Hopfner. The species is a little smaller than *illecta* (= *magdalena* Strecker) and may be easily recognised by its pale greenish-gray, mossy primaries, with the lines dusky and rather diffuse. The hind wings are light yellow with the median band straight, terminating before the margin with a short, rather abrupt curve. The terminal band is abbreviate, narrow, scalloped on its outer edge over the median nervules. There is a small black spot on the margin before anal angle. The species is very distinct and can be mistaken for no other.

Catocala abbreviatella Grote.

I have this species from Illinois, taken by Mr. Bean. The t. a. line is straight, outwardly oblique to below median vein, when it becomes obsolete. It is not black shaded as in *Whitneyi*, which I have from the same locality. The three species, *nuptialis* (= *myrrha* Strecker), *abbreviatella* and *Whitneyi*, form a series of allied forms, but can be sufficiently and readily distinguished.

Catocala gracilis Edw.

The form described by Mr. Edwards has the primaries light gray, the lines broken and the internal margin more or less shaded with blackish. The species recalls the concluding *amica* group in the colors, bluish gray primaries and bright hind wings, and I have put it last in the series on this account. I am not certain now what Mr. Edwards' *similis* is. In Mrs. Bridgham's collection is (or rather, was) a specimen labelled *similis* by Mr. Edwards, which belonged to what I consider as a variety of *gracilis*, having the primaries mixed bluish gray, rather dark and somewhat hoary. The lines are distinct, or usually so, and the basal dash of *gracilis* is wanting. This last seems the only important character, but it is present in var. *basalis* of *habilis* and wanting in the type. This dark form (which seems also a little shorter winged) has been taken with the type by myself near Buffalo, and by Dr. Bailey near Albany. I have seen it also from Pennsylvania. In the collection of the Ent. Soc. of Phil. there is a specimen labelled *similis*, which in my "Revision" I have referred to as belonging to this variety of *gracilis*. But Mr. Edwards' description will not agree in this that he says: "beyond is a ferruginous band followed by a gray line which is dilated on the costa so as to make a triangular apical spot." This and the size will not correspond, and it is probable that Mr.

Edwards has described some one other of our yellow-winged smaller species, and has afterwards mistaken his species, or mixed up different forms at the same time. This mixed dark blue-gray form, with distinct black lines and without the small basal streak of *gracilis*, I propose to designate by the name *sordida*: it varies as *gracilis* does in the suffusion of the primaries along internal margin with black in some specimens. Both the description and the type of Mr. Edwards' *parvula* correspond to that form of *minuta* which has this dark suffusion on primaries. *C. minuta* is allied, though a smaller form, to *fratercula*: both forms have the dentate white subterminal line usually obvious. From an examination of Kansas specimens, no doubt remains on my mind that *atarah* is founded on more generally obscure specimens of *fratercula*. An example of *fratercula* in the collection of Dr. Bailey has the primaries suffused with black over the median space.

NOTES ON THE LARVA AND PUPA OF EUCHAETES COLLARIS.

BY G. H. VAN WAGENEN, WESTCHESTER CO., N. Y.

I have, for three seasons, raised *Euchaetes collaris* from the larva, it being very abundant in this locality, and present the following notes as the result of my observations:

The larvæ feed on the *Apocynum androsacmifolium*, or Spreading Dogsbane. They will in confinement feed on *Asclepias*, but I have never, after careful search, found but one of the larvæ on it in the field. They feed at night, leaving their food-plant and hiding themselves during the day. About dusk they will be found crawling up the stems of the *Apocynum*.

Unlike *egle*, which feeds in companies, these are solitary feeders, and I have never found more than two on the same plant; generally there is but one. The color of the hairs in the early stages of the larva is almost white, but changes to slate color when ready to go into the chrysalis.

The early broods go into the chrysalis state about the end of July, and the imago appears in ten days or two weeks. The later broods remain in

the chrysalis during the winter, and emerge in the following June. They spin a slight cocoon between the leaves or on the ground. They are very easily raised, and require little feeding, eating much less than *egle*. The moth appears here from the middle of June to about the middle of July, and again the latter part of August.

I am indebted to Dr. Lintner, of the State Museum at Albany, to whom I mailed specimens of the larvæ and pupæ, for the following scientific description. The Dr. states that these specimens were not in the best condition for the purpose, "having lost many of their hairs from rolling," but on comparing his description with larvæ fresh from the plant, it seems to me perfectly correct.

LARVÆ OF EUCHAETES COLLARIS.

Sub-cylindrical, tapering moderately at the extremities. Head nearly as large as the first segment, pale luteous with black ocelli; body pale bluish white, semi-transparent; the pro-leg bearing segments with twelve rows of tubercles, from which radiate pearl-gray branching hairs varying from sparsely sub-spinose to thickly branched, which dorsally are about the length of the diameter of the body, except on the last three segments, where are some twice as long; the lateral hairs are shorter, but perhaps from attrition; the longer hairs tend to unite at their tips in pencils of a slaty hue. The tubercles, in their location on the segments referred to, alternate between their anterior fourth and posterior third; the sub-dorsal ones are oval, the lateral ones elliptical, the latero-stigmatal sub-rotund, as are also the much smaller stigmatal ones; the form of those of the two inferior rows is not evident. The stigmata are small, narrowly elliptical, white, annulated with black. The legs are unicolorous with the body, the terminal pair quite projected backward.

Length of the larva at rest, .87 inch; in motion, 1.12 inch. Diameter at broadest part, .16 inch.

The cocoons are slight, consisting almost wholly of the hairs of the larva, closely investing the pupa, their length from one-half to five-eighths of an inch, with a diameter of about one-fourth of an inch.

The pupæ are black, closely punctated, ovoid, the terminal segments blunt and unarmed, the thoracic portion projected over the wing-bases in a sub-quadrate form.

PROCEEDINGS OF THE ENTOMOLOGICAL CLUB OF THE
AMERICAN ASSOCIATION FOR THE ADVANCEMENT
OF SCIENCE.

Room 56, Maxwell House, Nashville, Tenn., Aug. 31, 1877.

Mr. Grote was called to the chair and congratulated the meeting that there were found members from the South interested in the science of Entomology, and regretted the absence of the President of the Club and other officers. A letter was read from President LeConte as follows :

Philadelphia, Aug. 24th, 1877.

Secretary of the Entom. Club Am. Assoc. Adv. Sci., Nashville, Tenn. :

DEAR SIR,—I beg that you will express to the Entomological Club of the Association my great regret that I am not able to attend the meeting at Nashville. It was my intention to be present, but I find now at the last moment that it will be extremely inconvenient for me to leave this city. I greatly wished to take part in the discussion on nomenclature, but I have already expressed myself so strongly as against such changes as are produced by the rehabilitation of forgotten or disused names, that I think my opinions are fully understood by my colleagues

Very truly yours,

JOHN L. LECONTE.

The Secretary's report of last year's meeting was received and adopted.

The chair drew the attention of the Club to the report of Capt. Dall on the subject of Zoological Nomenclature made at this meeting, and deprecated any separate action on the part of the Club.

The following resolutions were then passed :

Resolved—That since the Association has under consideration the subject of Nomenclature, the present Committee of the Club on that subject, consisting of LeConte, Riley, Saunders, Scudder and Grote, be continued to report at next meeting.

Resolved—That a request be made on the part of the Club to the Standing Committee of the Association, that copies of Capt. Dall's report on Zoological Nomenclature be printed and distributed to all active members of the Club before the issuance of the Nashville volume, so that the matter may be duly considered before the next meeting of the Club.

The meeting then entered into an election for officers for the next meeting, with the following result :

President : James A. Lintner, of Albany, N. Y.

Vice-President : Wm. Saunders, of London, Ontario.

Secretary : B. Pickman Mann, of Cambridge, Mass.

Mr. Grote exhibited specimens in all stages of the new Pine Moth, *Nephoteryx Zimmermani*. He referred to Mr. Meehan's remarks after the reading of the paper before the Association on Thursday last, that this was probably the insect so destructive to the Scotch Pine about Philadelphia.

Prof. Nicholson stated that he thought from Mr. Grote's description and specimens that this insect was the one noticed as attacking the Scotch Pine near Knoxville. The trees had been imported from the north.

Mr. Grote alluded to the migratory habits of the Cotton Worm, and stated that in his original paper (Hartford meeting) he had shown that the moth hybernated, but died before it could find cotton on which it could oviposit the ensuing year. Where the moth state was not reached the chrysalis perished in cold winters over the cotton belt. The broods were irregular, occurring in the same locality some years as early as June, some years as late as September.

Prof. Stubbs stated that in the main Mr. Grote's theory of a progression from south to north was, he was satisfied, correct. At the same time he called attention to occasions where the moth appeared in small areas, and thought it possible that in some cases the insect might succeed in holding over.

Mr. Grote stated that he thought that in localities where the circumstances were favorable, Southern Florida and along the coast of Georgia, that this might occur. He had in his original paper alluded to this, and he thought it more likely that the irregular patches on the cotton belt were partial colonizations from the southward or from the sea coast of Florida and Georgia. The first brood was more irregular in distribution. He further said that Prof. Tutwiler, of Ala., had told him that the observations made in his locality were to the effect that a south wind brought the worm ; in the present year the prevailing winds were from the north and they had been free from the worm in Northern Alabama. Mr. Grote concluded by urging the creation of a scientific commission to look into

the facts of the case. It was one that was the most important to the agricultural interests of the South.

Prof. Nicholson stated that he had observed a few specimens of the Colorado Beetle near Knoxville; the seed had been brought from the north.

Judge Bell stated that this year he had seen the Potato Beetle at Exeter, New Hampshire.

Mr. Grote exhibited some rare Coleoptera collected at Buffalo, N. Y., by Mr. Ottomar Reinecke. Adjourned.

(Signed) A. G. WETHERBY, Sec'y *pro. tem.*

NOTES ON SOME SPECIES OF HOMOPTERA.

BY THOS. E. BEAN, GALENA, ILLINOIS.

The suggestion of Mr. Hill (quoted on p. 89) that *Homopteras* "*edusa* and *lunata* are possibly sexes of one species," has reminded me of my own doubts regarding not only *edusa* and *lunata*, but also *Saundersii*, and caused me to make a careful examination of my material.

My entire stock numbers 83 local specimens, arranged after authentic types in three series, consisting of 42 "*lunata*," 24 "*Saundersii*," and 17 "*edusa*."

The specimens separated as *lunata* show no white lines or areas on upper side of wings.

The *Saundersii* have two large ovate or crescent areas on outer edge of primaries, and one similar but still larger crescent on outer edge of secondaries; these areas are partly outlined with white or greenish-white, especially on the inner side. There are also white or greenish-white ill-defined bands across fore wings at region of anterior transverse line.

The *edusa* are like the last in appearance in all respects, except that the six marginal lunates are filled out with white, or pearl, or greenish-white.

After repeated observation and comparison of these 83 specimens, I feel no particular hesitation in declaring that the 42 *lunata* are all females, the 24 *Saundersii* and the 17 *edusa* all males.

Examination of the three series above mentioned appears to make evident the following results :

First—That the specimens do *easily* distribute into said three sets.

Second—That in general appearance the *Saundersii* and *edusa* series would be almost or quite indistinguishable but for the fullness of white on margin spaces of latter form, which constitutes so conspicuous a distinction.

Third—From the other two series that of *lunata* not only differs in lacking the white decoration, but is also different in the tone, the hue and depth of the diffused shades of color on the wings : so that *lunata* differs from the other two markedly more than those differ from each other.

Fourth—Aside from mere color and shading, the definite markings are *alike in the three series*. Upon the basis of the characteristic lines alone, tone not taken into account, it would be safe to say that if there are two or more species within the limits of the entire set of specimens, then the same two or more species can also be found in *each* of the three series as above arranged ; that is, there is as much *essential variation* in either series as between any two series, or very nearly as much.

Fifth—By superior robustness of body, and especially greater fullness of abdomen at post-median region, as also in regard to antennæ, the specimens in *lunata* series differ strikingly from those of the *Saundersii* and *edusa* series. From these characters, with the difference of tone and absence of white clouding, I conclude that *there is a valid distinction of the lunata set from the other two*.

This distinction of *lunata* from the others must be either of species or of sex. As the *Saundersii* and *edusa* series differ unimportantly, by presence of a little white or much white, a distinction which alone is not valid either for a difference of species or sex, and as *these seem to be males* ; as, furthermore, the *lunata* do validly differ from the others for species or else for sex, and *these seem to be females* ; and as, finally, the three sets are alike in the definite lines important as criteria of specific difference—I therefore conclude *Saundersii* and *edusa* two male forms, and *lunata* the female form of one and the same species.

DETAILS OF COMPARISON.

Among the lunatae there is only moderate variation, consisting chiefly in less or greater development of the brown suffusion and the blue-black shades ; in about seven specimens the dark shading is largely obsolete and replaced by light brown in an area on f. w. from t. a. line to t. p. line and beyond, extending partly to outer margin, but not reaching costa. There is an appreciable though slight variation as to curves and dentations of t. p. line.

The Saundersii present moderate variation as to amount of the white decoration, and in several specimens this is almost replaced by greenish white. There is some variation in tone of coloring, in degrees from medium brown to dark, somewhat purplish brown. One or two show on f. w. a somewhat yellowish light-brown area between t. a. and t. p. lines, not reaching costa. A little variation in t. p. line.

The edusæ vary slightly as to fullness of the white ovals or crescents on margins. Also as to color of same ; some have crescents entirely white, others have them greenish but outlined with clear white. On f. w. of two examples area from t. a. to t. p. line is colored nearly uniform yellow-brown, the dark shades almost obsolete. Regarding variation in tone of coloring, the comment on *Saundersii* applies equally to this set.

EDUSA AND SAUNDERSII COMPARED.

Closely alike in size ; if any difference, the latter average slightly larger.

Coloration, except as to degree of white, furnishes no means of separation.

In *Saundersii* the marginal crescents are merely sketched or outlined with white, pearl, or greenish-gray ; in *edusa* the crescents are filled out with an amplitude of white, &c., some specimens showing greenish-white crescents outlined with clearer white. *Saundersii* looks like an unfinished *edusa*.

• In observing the white decoration, at first the division of the two sets seems complete, but closer search discovers one *edusa* from whose marginal crescents the white is about half obsolete, and among the *Saundersii* are two whose crescents are so largely powdered with white that the step between these two and the cited *edusa* is no wider than the interval

between these two and the other *Saundersii*. Still, aside from these three, the specimens in either set are greatly uniform among themselves and the contrast is great between the two sets *as to this feature of decoration with white*.

I am unable to find other severance than by this white decoration ; indeed, the two series are in other respects such counterparts that if the sex characters permitted, I should conclude *edusa* the male and *Saundersii* the female. But very evidently such is not the case, for both series seem to contain males only.

LUNATA COMPARED WITH THE OTHERS.

Individuals more robust in body than those of the two other series, but as to expanse of wings about the same average.

Of the 42 specimens almost all have the general appearance of females. Of only one or two would there seem any doubt, and even these do not look like males, but their appearance is less conclusive as to their sex. In the other sets the reverse seems the case ; all but two or three decidedly appear to be males, and the exceptions do not look like females, but merely have less definite characters.

In color *lunata* contrasts with the others by a more sombre style of decoration.

On under side the markings of the three series agree as to essentials, the difference being in shading, &c. *Edusa* and *Saundersii* are alike, with a moderate range of individual variation. *Lunata* has on an average more distinct markings, varying to partial obsolescence of the strong lines.

The three forms occur coincidentally, the season of chief abundance, as indicated by the dates of my specimens, being from mid-July to about 10th August. A few bright ones show dates during September, others late in October, and one *lunata* November 12th. Of the late flight, part survive winter and are found in June (May more rarely) much worn. No evident fresh examples dated earlier than July 15th.

P. S.—On p. 136 see Mr. Grote's correction of p. 89.

A few *lunata* and *Saundersii* taken during the past two weeks (August 11th) tend to confirm the foregoing comments.

CORRESPONDENCE.

BUTTERFLIES ON MARTHAS VINEYARD.

DEAR SIR,—

I have spent the last ten days on this island, at Oak Bluffs, and made several excursions into the back country for a distance of about three miles. I find *C. phleas* the commonest butterfly, seen everywhere, in the town, fields and on the beach. Next to that *Argynnis idalia*, which abounds in old fields, and is just now fresh from chrysalis. Of *P. tharos* I have taken two fresh males, var. *marcia*. *Satyrus alope* male is making its appearance and the species may become quite common. I am not sure that some examples of *nephele* have not been seen also. Another *Satyrus* I saw in the oak woods, but could not determine whether it was *eurytris* or *canthus*. *Philodice* seems rare, and I have seen one example of *antiopa* and one of *atalanta*. No *Hesperians* at all have been seen, and no other butterfly than I have above mentioned. On a ride to Boston I saw a *Terias nicippe* flying near Brockton Station.

W. H. EDWARDS.

July 29th, 1877.

DEAR SIR,—

Perhaps some of the readers of your valuable paper might be interested in knowing of the capture at this place of another superb *Catocala marmorata* Ed., which I took July 2nd. It was sitting on the trunk of a Silver Poplar tree, within a few yards of where I captured one on July 10th, last season. Prof. Wetherby and myself have each taken a single specimen of *Catocala agrippina* Strecker, whose types were from Texas, I believe.

CHARLES DURY.

Avondale, Ham. Co., Ohio, Aug. 15th, 1877.

DEAR SIR,—

On p. 120, vol. ix., CAN. ENT., is published a note by Mr. Robert Bunker, referring to the "effect of hot weather upon certain Sphinges," particularly *P. satellitia*.

I have regularly for several years past taken mature larvæ of *P. achemon* previous to July 10th, the transformation of which, so far as I know, was

completed by Sept. 25th of the same year. This year, although everything is about two weeks behind its usual time, I received two mature larvæ July 5th, both of which had unfortunately been killed ; with them came a moth taken the same day, whose wings had not expanded when discovered.

The time from deposit of egg to pupation is about eight weeks, sometimes a day or two more, but usually three or four days less, hence these ova must have been deposited before May 10th, or before even *Colias philodice* had appeared. As I know of no Sphinges emerging here before the middle of June, the contraction of the time of growth would be very remarkable in this case, even had the weather been hot, which it has not.

I have taken this moth (*P. achemon*) in May, flying about the early spring flowers in company with *Deilephila lineata*, both very ragged and much faded : this would seem to suggest that *P. achemon* (and perhaps other Sphinges) exists as it were in duplicate, the September examples hibernating in the perfect state and depositing ova in the spring. A state of affairs possibly instituted by a long, dry and warm season in summer and autumn, and continuing until a severe winter, destroys the hibernating examples, which must also suffer greatly from mice, and their ova and larvæ from late frosts, thus accounting for their rarity.

This is, I admit, a very weakly supported hypothesis, resting entirely upon circumstantial evidence, as early examples of strong moths like Sphinges *might* travel many miles before a strong south wind ; if, however, some collector who has females emerge in September, would dissect them and ascertain how far the ova are developed, the result would probably offer a satisfactory solution as to the probability of occasional or regular hibernations.

It may be a matter of interest that *Pieris rapæ* has reached this point in its westward journey. I took one ♂ example at Maplewood, immediately west of this city, Sept. 8th ; seemed to be more abundant than *P. protodice*, which was flying in the same locality.

C. E. WORTHINGTON, Chicago.

DRYOCAMPA RUBICUNDA (FABR.)

DEAR SIR,—

Mr. Linter, in his "Entomological Contributions," No. 3, has a very elaborate description of this larva, noting, indeed, very minute char-

acters and some which are by no means constant, such as the number of spinules on different portions of the body. There are some few words to which exception may be taken; for instance, the color is not always "apple green," being not unfrequently greenish-white, and in such case the lateral stripes are nearly black.

But, speaking generally, the description is very accurate; one important omission has, however, occurred, and it is to this omission I wish to draw attention. I have, from time to time, reared hundreds of these larvæ, and I never saw one that had not a *conspicuous red patch*, with white granulations, on the stigmatal portions of segments 11 and 12. That so careful an observer as Mr. Lintner should have overlooked this mark, had it been present in the specimens he examined, seems improbable; and now the question arises—Has not Mr. Lintner described some species not *rubicunda*?

I urged this consideration on Mr. Lintner some two years since, and sent him a small batch of larvæ for his examination. I think he told me that they all died, and, so far as I know, he has taken no further notice of the matter.

I have an indistinct recollection that some one has recently described a new species of *Dryocampa* allied to *rubicunda*, but do not feel quite sure; but, any way, the questions are important—Did Mr. Lintner describe *D. rubicunda* larva inaccurately? or, Did he describe the larva of a new species? or, Do the larvæ of *rubicunda* vary to the extent of sometimes losing the red patch?

W. V. ANDREWS, Brooklyn, N. Y.

FOOD PLANTS OF SATURNIA IO.

DEAR SIR,—

The larvæ of this species are unusually abundant here this season, and I have taken them feeding on White Birch, Oak, Corn, Willow, Sweet Fern (*Comptonia asplenifolia*), Currant, Apple, Wild Indigo (*Baptisia tinctoria*), Clover, Bush Clover (*Lespedeza*), Snow Berry (*Symphoricarpos*), and the Ash.

L. W. GOODELL.

Amherst, Mass., Sept. 1st, 1877.

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The Canadian Entomologist.

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LONDON, ONT., OCTOBER, 1877.

No. 10

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The seventh annual meeting of the Entomological Society of Ontario was held in London, at the rooms of the Society, on Wednesday evening, September 26th,

The President, W. Saunders, in the chair.

A considerable number of members from various parts of the Province were present; also a fair representation of those resident in the city.

After calling the meeting to order, the President expressed his regret that the Society had during the year lost the valued services of one of its officers. Owing to pressing business engagements, the Secretary-Treasurer, Mr. J. H. McMechan, had found it necessary to resign. Pending the appointment of a successor, Mr. J. Williams had kindly consented to act as Secretary-Treasurer *pro tem.*, and in this capacity had rendered most valuable and timely assistance.

The report of the Treasurer showed a very satisfactory state of the finances, there being a balance to the credit of the Society at the close of the financial year of two hundred and thirty-six dollars.

REPORT OF THE COUNCIL, 1877.

In presenting the seventh annual report, the Council feel highly gratified at the success that has attended the labors of the Society during the past year.

We are happy to note the return of the Society's Centennial collection of insects, which reached London in good condition shortly after the close of the International Exhibition. This collection, which was noticed in your last annual report, is now placed in the Rooms, where it will in future be available for reference. As this beautiful collection was made

up largely from the cabinets of individual members of the Society, who generously loaned the insects for the purpose of exhibition, it was thought that if the immediate return of the loaned specimens was insisted on, the value of the series would be greatly impaired ; but we are happy to state that the parties concerned have in most cases given their consent to allow the specimens to remain on deposit in the Society's Rooms ; so that we still retain the Centennial Collection of Canadian Insects almost intact, a monument to the zeal and industry of those members of the Society who were actively engaged in this work.

We may add that this collection was placed on exhibition at the Rooms on several occasions after its return, when some of the members were present to assist visitors, and from the interest manifested then by the public in the matter, we would recommend that the Rooms be thrown open occasionally to all who may desire to visit them, and that public notice be given of the same.

The CANADIAN ENTOMOLOGIST has almost completed its ninth volume, and fully maintains its reputation as a record of the latest investigations and discoveries in scientific and practical Entomology. We would return our heartiest thanks to all those who have so kindly contributed to the pages of the ENTOMOLOGIST, and request that they will continue to favor the Editor with the results of their observations and experiments. Although we have reason to feel gratified at the efforts of the Society to excite in the general public an interest in Entomology, yet we would respectfully suggest that our successors may be able in some measure to improve on the means adopted in the past to render the ENTOMOLOGIST even more useful to beginners in this interesting science, either by more frequent descriptions and illustrations of our common insects, and perhaps by referring to the insects that are likely to appear in each month of the summer, and the manner of their capture and preservation, or in any other method that may appear suitable.

We are happy to note a steady increase in the number of members. The Branch Societies, especially in London and Montreal, are progressing favorably.

The funds of the Society are in a gratifying state ; by economical management we have been enabled to sustain and successfully carry out all the operations we have undertaken ; for details we refer to the report of the Secretary-Treasurer.

The Library has been enriched by a number of valuable scientific works, and others of more general interest, but which bear on Entomological subjects. Among the additions we may mention the *Encyclopedia Britannica*, as far as at present published, which will prove invaluable as a means of reference. Our stock of engravings and electrotypes has been slightly increased, but in this line we are greatly restricted by want of means, and are obliged generally to content ourselves with electrotypes of other illustrations. We believe that a much larger sum than is annually given for this purpose might be profitably expended in procuring original illustrations.

Submitted on behalf of the Council by

JOSEPH WILLIAMS, Secretary-Treasurer.

The President then proceeded to deliver his annual address.

ANNUAL ADDRESS OF PRESIDENT.

GENTLEMEN,—At the close of another year it is my duty and privilege to offer you a few remarks relating to our progress as a Society, and also to the general advancement of that department of natural science in which we all feel so deep an interest.

The progress of the Entomological Society of Ontario during the past year has been steady and continuous. Every season witnesses an infusion of new blood into our ranks, mainly from among the young, who, when entering on the pursuit of this charming study, bring with them all the enthusiasm and ardor of youth. Our membership is thus gradually increasing, and our influence and sphere of usefulness yearly extending. The importance of the study of Entomology is gradually becoming more deeply impressed upon the public mind. The Entomologist needs no longer to apologize for the trivial character of his pursuits, for small and apparently insignificant as the operations of the individual destructive insect may appear, yet when multiplied, as they usually are, by millions, their work is so disastrous and so desolating that the study of their life history, with the view of combatting more effectually their enormous increase, becomes of the most vital importance.

We have to note the prevalence during the past year of several insect pests. Early in June our gardens, orchards, and even our forests in the western portion of Ontario were frightfully devastated with the Forest

Tent Caterpillar, *Clisiocampa sylvatica*. There were millions upon millions of them, and so enormous were their numbers, and so persistent their attacks, that after fighting them bravely for a week or two, many gave up the contest in despair, weary of the slaughter. Many an orchard was rendered bare and leafless, and in some instances the woods were so void of foliage as to remind one of winter. This was particularly the case about London, and our orchards and gardens here were saved from destruction only by the most persistent effort. For several weeks caterpillars were swarming everywhere, so that the timid scarcely dared venture out under the shade of trees for fear of bringing them home on their clothing or persons. By the end of June they had nearly all become chrysalids, and it was interesting to observe the strange looking deformities they occasioned among ornamental shrubs and flowers by twisting the leaves into suitable forms in which to enclose their cocoons. On the trees the few fragments of leaves remaining were put to a similar purpose, and thus sewed up and hanging pendant with the weight of sometimes two or three cocoons huddled together, they looked very odd.

On examining a number of these chrysalids, a large proportion of them were found to be infested with parasites, which materially lessens the chances of their being so very numerous again next year; still we fear that enough of them passed safely through all their preparatory stages to give us some trouble another season.

The Cabbage Butterfly, *Pieris rapæ*, is still progressing westward. This year it has extended its domain as far as Chicago, where a few of the advance guard have been captured. In the neighborhood of London their larvæ have been very destructive this summer, so disfiguring and destroying the cabbages in many instances as to render them entirely worthless. The history of the introduction of this pretty little pest forms an interesting chapter in our Entomological annals. During the time of the Trent difficulty in 1861 a quantity of fresh vegetables were sent along with other stores to Quebec for the sustenance of the gallant little army which was despatched to our shores. As the Cabbage Butterfly is said to have made its appearance shortly after this period, it is presumed that it was accidentally introduced with the stores for the troops. In 1863 specimens were sent to us from this district for determination, which was the first intimation we had of their existence in this country. By 1866 the butterfly had spread further west than Montreal, and east as far as the Saguenay River. In 1869 it was reported as common in New Jersey, and

by 1871 it had travelled east as far as Halifax, Nova Scotia, and west to the middle of the State of New York. It now embraces an area bounded by the shores of the Atlantic from the River St. Lawrence to Virginia, and has overrun the whole country westward as far as Chicago. A few days since, while on a visit to the Muskoka District, I was surprised to find them plentiful, in company with the Colorado Potato Beetle, as far north as the head of Lake Rosseau.

The wonderful manner in which this insect has adapted itself to the varying climatic characteristics embraced within this wide area, is a matter of astonishment. It seems to thrive alike in the cold north and sunny south, and in every place where it establishes itself it has multiplied so rapidly as to become in a very short time the commonest of all butterflies. The little parasite, *Pteromalus puparum*, which has also fortunately been introduced from Europe, and which is finally destined to keep this pest within reasonable bounds, is on the increase here, but is not yet sufficiently numerous to fulfil its mission as successfully as we could wish.

The Colorado Potato Beetle, as predicted, has at last found its way across the Atlantic, and founded colonies on the Continent and in the British Isles. Their arrival and settlement has caused a commotion almost as great as would the approach of a hostile army. According to newspaper accounts, large patches of ground where the enemy has been seen lurking have been saturated with benzine and fired, while in the search the whole surface has been turned over with the spade and shovel as carefully as if each specimen were a nugget of gold or a diamond. Cargoes of all sorts in which it was suspected the intruders could find a hiding place have been submitted to the most rigid examination by government officials, and various edicts were promulgated, with a view to strangle this evil in its infancy; but the beetle is heedless of enactments, however prohibitory, and we fear that no vigilance, no matter how persistent, will avail in preventing the spread of this little intruder, and that before long the potato grower in Europe will be obliged to regularly adopt measures for poisoning this pest similar to those so successfully carried out by our own people.

Since I was last privileged to address you the Congress of the United States, in view of the enormous losses yearly inflicted on agriculture by destructive insects, have appointed an Entomological Commission composed of eminent Entomologists, who shall devote their whole time for several years to a study of the habits of the various insect pests and the

thorough testing of the efficiency of such remedies as have been or may be devised for their destruction, and to report progress from time to time. A liberal appropriation to defray the expense of this work has been made, and the laborers are now actively engaged in the field.

Early in the year your President was requested by the Chief of this Commission, Prof. C. V. Riley, to bring this important matter before our Government and ask their influence towards furthering the objects in view. Accordingly, at a meeting of the Council of Agriculture, held in June last, the writer introduced a resolution urging the co-operation of our Government with that of the United States in this undertaking, which was unanimously adopted by the Board and transmitted to the proper authorities. I am pleased to be able to state that the Minister of Agriculture, in his reply, assured us that this subject had already engaged their serious attention, and that every effort would be made to aid the Commission in its work. This season is being spent by these savans in especially studying the habits and breeding places of the destructive Locust of the West, and already they have made extended observations, not only in the western territories of the United States, but also in some of the adjoining portions of our Dominion.

The Entomological Club of the American Association for the Advancement of Science held its annual meeting in Nashville, Tenn., commencing on the 30th of August, when many interesting subjects were discussed. An important paper was read by A. R. Grote, Esq., of Buffalo, N. Y., on a new insect destructive to the red and white pine trees, the sources of our valuable lumber trade. From the details given of the work of this insect we fear it may prove a formidable foe to the future growth of our pine forests. Our Society has usually been represented at these annual gatherings, but on this occasion, owing to other pressing and unavoidable engagements, those of us who have usually attended were prevented from being present.

We cannot better illustrate the recent progress made in Entomological science than by referring to one department, namely, that of the study of our night-flying moths. This has been greatly stimulated by the general practice of sugaring, by which immense numbers of these insects have been attracted, and their capture in good condition made an easy matter. This practice in America was but little followed until 1874, when an English Entomologist, Mr. George Norman, visited Canada, and, after having faithfully carried on the process of sugaring for a season, he pub-

lished the results of his labors and his mode of operating in our journal. His success was so unprecedented, and so many rare or hitherto unknown species captured, that collectors everywhere were induced to imitate his example, and in the short time that has since elapsed an immense number has been added to the list of known species, and our collections have been enriched by this means with an extensive series of hitherto rare specimens.

Our monthly journal, the CANADIAN ENTOMOLOGIST, is still well sustained, its pages being regularly filled with interesting and original contributions. Did time permit, I might have occupied your attention at considerable length by referring to the many valuable points brought out in these papers. I cannot, however, refrain from adverting to the contributions of Mr. W. H. Edwards, of West Virginia, on the life history of some of our butterflies, in which it has been shown that not a few of our so-called species are merely dimorphic forms of other species, and attention drawn to the important influence of cold in modifying these forms. By exposing the chrysalids to the influence of this agency by laying them for varying periods on ice, or placing them in an ice house, some of these dimorphic forms have been produced at will, thus throwing much light on the causes of variation in species.

I would also call your attention to the many recent valuable additions to Entomological literature in America, especially to the beautifully illustrated work of Dr. A. S. Packard on the Geometrids of North America ; to the continuation of Edwards' magnificent work on North American Butterflies ; to the learned and elaborate treatise on the Ryncophora of America north of Mexico, by Drs. LeConte and Horn ; to the excellent works of Prof. Townend Glover, of Washington, on American Diptera, Orthoptera and Hemiptera ; to the valuable reports of the State Entomologist of Missouri, and many other excellent works. But I must not trespass longer on your patience. Thanking you for your kind partiality in honoring me as you have done, I have the honor to be

Yours very sincerely,

WM. SAUNDERS.

London, Ontario, September 25th, 1877.

The election of officers then took place, with the following results :

President : W. Saunders, London.

Vice-President : E. Baynes Reed, London.

Secretary-Treasurer : J. Williams, London.

Council : Wm. Couper, Montreal ; Rev. C. J. S. Bethune, Port Hope ; J. Pettit, Grimsby ; J. M. Denton, London ; Rev. R. Burnet, London ; R. V. Rogers, Kingston ; Jas. Fletcher, Ottawa.

Editor of CANADIAN ENTOMOLOGIST : W. Saunders, London.

Editing Committee : Rev. C. J. S. Bethune, Port Hope ; E. B. Reed, London, and G. J. Bowles, Montreal.

Library Committee : The President, Vice-President, Sec'y-Treasurer and J. M. Denton.

Auditors : Chas. Chapman and A. Puddicombe, of London.

During the time allotted for miscellaneous business, Mr. D. W. Beadle, of St. Catharines, spoke of the ravages of the Cabbage Butterfly, *Pieris rapæ*, and of the great benefit that would be conferred on gardeners by the discovery of some remedy which might be safely used for this pest. He also referred at length to the great success which had attended the labors of the Entomological Society, and of the high reputation it had acquired in America and foreign countries.

Mr. P. C. Dempsey, of Alboro, stated that hot water had been successfully used in his neighborhood to destroy the *Pieris* larva ; that experiment had shown that the cabbage would bear the application of water heated to 200° Fahrenheit, without injury, while water at a somewhat lower temperature than this would effectually destroy the larva. The hot water may be applied through a rose sprinkler or by the use of a dipper. He also stated that a cold infusion of Quassia in the proportion of two or three pounds to a barrel of water had been found effectual in destroying the worm, and more convenient in its application than hot water. This solution may give a slightly bitter taste to the vegetable unless thoroughly washed, but it is perfectly harmless to the human system.

Mr. Chas. Arnold, of Paris, referred to the increasing ravages of the Codling Worm (*Carpocapsa pomonella*), and stated that he had scarcely a sound apple in his orchard this year. This was doubtless partially due to the small crop, and he hoped that the scarcity of apples this season would so far starve out this insect that we might enjoy some immunity from its attacks for a year or two.

Rev. Dr. Burnet, President of the Fruit Growers' Association, expressed his pleasure at being present, and his high appreciation of the labors of the active members of the Society, and referred to the great benefits which

fruit growers had derived from the publication of the results of their investigations on noxious insects injurious to fruits.

Prof. Buckland, of the Department of Agriculture, Toronto, spoke of the great utility of the work carried on by the Society in diffusing information in reference to the various insect pests which afflict the farmer and fruit grower, and of the flattering notices he had seen in foreign journals concerning the CANADIAN ENTOMOLOGIST. He believed the Society well deserved the cordial support of all those interested in agriculture.

DESCRIPTIONS OF NEW SPECIES OF BUTTERFLIES BELONGING TO THE N. AMERICAN FAUNA.

BY W. H. EDWARDS, COALBURGH, W. VA.

Melitaea ulrica.

Male.—Expands .85 inch.

Upper side black, marked and spotted with deep red fulvous, much as in *P. vesta*; both wings have a submarginal series of small crescents, the one on middle of primaries considerably larger than any other; on primaries this series is preceded by a sinuous row of small spots, and next by a bent row of larger ones; a fourth row curves round the end of the cell, and there are some spots in and below cell. Secondaries have two rows of irregular small spots across the extra discal area, and across the disk a broad band; some spots in cell and on basal area; fringes fuscous alternating with white.

Under side of primaries black over the outer fourth; next the margin a narrow band made up of confluent fulvous spots, and immediately beyond this is a series of small white spots, corresponding with the submarginal series on upper side, the middle one long, lanceolate, and a similar one at apex, but somewhat smaller; the second row of upper side is repeated, but beyond this to base the ground is mostly fulvous, representing the spots of upper side, but now enlarged and mostly confluent; secondaries have a marginal band like that of primaries, followed by a complete series of large white spots, crenated, or the middle ones almost

lanceolate ; above these the area is black, and in this is a row of small rounded fulvous spots stopping a little before the costal margin ; across the disk a row of white points and a continuous white band ; beyond to base fulvous on black ground, but with a white spot in cell, and a band near base, and one directly at base.

Body above black, with fulvous hairs ; beneath cinereous ; legs cinereous, fulvous in front ; palpi yellow-fulvous in front, white at base ; antennæ black annulated with white ; club black, fulvous at tip.

Female—Expands .9 inch. Scarcely differs except that the fulvous is paler.

From 4 ♂, 2 ♀, taken by Mr. Z. Boll, at San Antonio, Texas. On the under side this small species much resembles *Mel. Gabbii* in general appearance ; the wings are narrow, and primaries much produced. It belongs to Group II of my Catalogue.

Melitaea dymas.

Male—Expands .95 inch.

Upper side brownish-black, marked and spotted with orange-fulvous ; primaries have a submarginal row of rounded spots, obsolete on apical half ; both wings crossed on the extra discal areas by a common band of separated spots, mostly sub-quadrate, bent opposite the cell of each wing and almost at a right angle on secondaries ; primaries have five spots on cell, filling it, except as they are separated by black lines ; and several small spots at end of and below cell ; secondaries have the basal area nearly all fulvous, leaving a broad belt of black between this area and the extra discal band ; in the cell a subovate black spot with fulvous stripe in middle ; on the black belt in the several interspaces are a few fulvous scales ; fringes of primaries fuscous, with a little white at intervals, and the apex wholly white ; of secondaries fuscous only.

Under side of primaries has the margin bordered by a confluent band of crenated spots, and before this is a row of narrow dull white lunate spots, or in part lanceolate, stopping at second branch of median ; these stand upon a narrow black belt ; beyond to base the ground is orange fulvous, with four transverse black lines in cell, a curved row of rounded black spots outside cell, and an indistinct black line across the disk. Secondaries have the marginal series dull white on black ground, and next preceding an orange-fulvous band, and then a broad dull white band cut

beyond the middle by a black stripe from outer to inner margin ; the basal area, including the cell, orange, except a triangular white spot in cell, edged with black, and a white transverse band similarly edged ; along the inner margin this band is joined to the discal white band.

Body above color of wings, beneath gray-white and black ; legs black and white, fulvous in front ; palpi fulvous with black hairs, white at base ; antennæ fuscous annulated with white ; club black.

Female—Expands .95 to 1 inch.

Upper side uniform yellow-fulvous ; a white patch on edge of costa of primaries two-thirds the distance from base is limited by the subcostal ; hind margins of both wings edged with black, broadest at apex of primaries and along the middle of secondaries ; on this rests a common series of spots, color of the ground, mostly crenated, and bordered above by a crenated black stripe ; the disks are crossed by two black stripes, the outermost on primaries being nearly parallel to hind margin and not distinct, the other bent round end of cell ; on secondaries these are obsolete ; in cell of primaries four transverse, rather wavy lines, and a slight mark near base ; two similar lines below cell ; secondaries have in and below cell very similar lines, but more or less obsolete.

Under side nearly as in male, the only difference being in the paleness of the ground and the obsolescence of the black markings on primaries.

From 1 ♂, 3 ♀, also sent me by Mr. Boll, and taken at San Antonio, Texas. I sent one example of each of these species to Mr. A. G. Butler, British Museum, to ask if they had been described as Mexican. Mr. Butler regards them as hitherto undescribed. The wings of *dymas* are narrow, primaries much produced. There is a remarkable difference between the sexes on upper side, but below the markings are almost identical. It is the opinion of Mr. Boll that these constitute but one species. This species belongs to Group III of my Catalogue.

Amblyscirtes nysa.

Female—Expands 1.1 inch.

Upper side glossy dark brown ; primaries have three small transparent spots forming a curve, on costal margin, at three-fourths the distance from base, and a point on the disk ; fringes long, fuscous next the margins, but anterior mixed with white.

Under side of primaries a little paler, the spots repeated, the discal spot more distinct; secondaries brown clouded with blackish, a dark illy-defined band following the hind margin, a patch on disk and another on costal margin; also dark at base; some gray scales forming patches border the darker portions near outer angle, and there are others on the median interspaces. Body dark brown; below, thorax yellow-white and cinereous, the abdomen gray-brown; palpi yellow-white; antennæ fuscous above, annulated with gray-white, gray-white below; club black. From two examples, sent me by Mr. Boll, the other by Mr. Belfrage, and taken in Texas.

Pholisora nessus.

Male—Expands 1.1 inch.

Upper side light brown; a black band crosses the extra discal area of both wings, formed by short longitudinal stripes, one on each interspace; and a narrower band, more confluent, crosses the disk of primaries and basal area of secondaries; along the hind margins is a dash of gray in each interspace, not distinct; primaries have three transparent spots on costal margin at end of the fold, and three others half way beyond to apex; and on middle of disk are two marks forming a V-shaped spot, not quite joined at the angle; secondaries have a similar small spot near outer angle and two on the disk; fringes long, fuscous, with a few gray hairs.

Under side lighter brown, clouded much as above; the spots repeated. Body dark brown; palpi white; antennæ fuscous annulated with gray white; club black.

Female—Expands 1 inch.

Similarly marked, the colors lighter, especially on under side.

From 2 ♂, 1 ♀, received from Mr. Boll, taken at San Antonio, Texas. Mr. Meske also has this species from Bastrop, Texas.

ON THE BLACK-WING GROUP OF THE GENUS CATOCALA.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

The "species" of the black-winged group (*Mormonia* of Hübner) comprised in the genus *Catocala* have been largely augmented as the

collections are increased throughout the country. Without doubt, when we shall be thoroughly conversant with the immature stages, our knowledge of the species will be more perfect. Our collections containing only the perfect stages, the forms are clearly recognizable. Mr. Grote has recently arranged the species of this group in the Collection of the Buffalo Society of Natural Sciences as follows, and a species named for the first time is contained therein. The following classification contains our North American species, one of which (*sappho*) is unknown to me.

Gen. *Catocala* Schrank.

Group I, *Mormonia* Hübner.

Sub-group I (fringe of secondaries white).

- | | |
|----------------------------------|----------------------------------|
| 1. <i>C. epione</i> Drury. | 8. <i>C. relecta</i> Grote. |
| 2. <i>C. lacrymosa</i> Guen. | 9. <i>C. flebilis</i> Grote. |
| 3. <i>C. sappho</i> Strecker. | 10. <i>C. ulalume</i> Strecker. |
| 4. <i>C. subviridis</i> Harvey. | 11. <i>C. Robinsonii</i> Grote. |
| 5. <i>C. agrippina</i> Strecker. | 12. <i>C. obscura</i> Strecker. |
| 6. <i>C. viduata</i> Guen. | 13. <i>C. simulatilis</i> Grote. |
| 7. <i>C. desperata</i> Guen. | |

Sub-group II (fringe of secondaries blackish).

- | | |
|---------------------------------|----------------------------------|
| 14. <i>C. Levettei</i> Grote. | 17. <i>C. insolabilis</i> Guen. |
| Syn. <i>C. judith</i> Strecker. | |
| 15. <i>C. Angusi</i> Grote. | 18. <i>C. tristis</i> W. H. Edw. |
| 16. <i>C. residua</i> Grote. | |

It would seem best to follow this arrangement of the species. In the second sub-group the apices of secondaries are not touched with white or scarcely so in *Levettei*. In *tristis* the white apical patch is quite evident.

C. subviridis, n. s.

♂. Allied to *agrippina*. Differing by the fore wings being shaded with dark silky green. Lines black, evident, accompanied by white scales, evident on internal margin. The brown shades of *agrippina* are wanting. Sub-reniform, detached, small; subterminal line white and rather evident. Beneath like *agrippina*, but the white bands are narrower.

Expanse $3\frac{1}{8}$ inch. Habitat, Dallas Co., Texas, Boll Coll. One specimen. Possibly figured as a var. of *agrippina* by Strecker.

C. residua, var.

♂. A remarkable aberration of this species is represented in the Collection by a specimen which has the left hind wing smaller and beneath hoary at base without the band. Fore wings with the t. p. line thrown out of position, back towards base of wing and aberrant in its course. Thorax rusty. Habitat, New York.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

GRACILARIA.

G. fasciella Cham.

G. 5-notella Cham.

With ten specimens of *fasciella* and two of *5-notella* before me, with scarcely a trace of variation in the ten, but with the two differing from each other somewhat and both differing very decidedly from the ten, I had no doubt as to the distinctness of the two species. A larger series, however, induces the belief that they belong to the same species. The difference between them may be thus stated: In *fasciella* the base and apex of the fore wings are brownish-gray, and between these portions are three brownish-gray and four white fasciæ, all very distinct and well defined. In *5-notella* the whole dorsal half of the wing is white, there is a small brown spot on the base of the costal margin, another further back, and still further back another which in the middle of the wing is produced backwards to the gray-brown apical part of the wing, which encloses two small white costal streaks. A larger series, however, shows that the two forms vary into each other and induce the suspicion that Dr. Clemens described his *G. fulgidella* from a form like *5-notella*. The tuft on the second joint of the palpi is minute, and in all of my specimens but two it has been removed in pinning.

G. Packardella Cham.

In this species there is great range in the intensity of the purplish tinge. Some specimens might be described as having it so strongly developed as to ally them to *purpuricella*, *stigmatella*, &c., while in others

it is very faint and delicate, the ground color of lemon yellow not being at all obscured by it. It is, however, allied to *superbifrontella* and *Severderella*, &c., more closely than to any other known species.

G. inornatella Cham.

This must be dropped from the list, as I am satisfied that it was described from worn specimens of *G. Packardella* and *superbifrontella*.

G. purpuriella Cham.

Since the last notice of this species was written I have bred it from larvæ feeding on the silver-leaf poplar ; but I have never met with it on the weeping willow, though it is common enough on many of our native willows. It may prove to be the European *G. stigmatella*, which feeds on willows. It is certainly very near that species.

ANTISPILA.

A. ampelopsiella Cham.

In Vol. 6 I have given this name to a mine and larva found in leaves of *Ampelopsis quinquefolia*, the imago being then unknown. I have also *loc. cit.* described a species bred from grape leaves, without naming it, because I thought it probable that it would prove to be *ampelopsiella*. Since then I have bred it both from *Ampelopsis* and from wild grape leaves (*Vitis cordifolia*), and it proves to be the same species described in Vol. 6. The description, however, is imperfect, having been prepared from a single slightly worn specimen.

A. hydrangeæella Cham.

This species was also named from the larva and mine only. I have since bred it. It is a little larger than *ampelopsiella*, though scarcely so large as *isabella* or *viticordifoliella*, and is perhaps the prettiest species of the genus. The palpi and tips of the antennæ (last five joints), and the under side of a few of the basal joints snowy white. Head, thorax, abdomen, inner surface of legs, hind femora and tibial spurs of hind legs like burnished steel ; tarsi of anterior and middle legs and tips of hind tarsi yellowish white, posterior tibia on outer surface and tarsi, except the tips, purplish, with metallic reflections. Anterior wings and a spot on each side of the thorax bronzy brown, without greenish reflections ; ciliæ

purple, tipped with silvery gray. The fascia, costal and dorsal streaks and apical spot are brilliant silvery; the fascia is not constricted on the fold and the streaks are placed as in the other species; the costal spot is small and the dorsal large and almost an exact triangle, being, however, a little wider on the base and the margins very faintly concave. Hind wings and ciliæ pale purplish fuscous.

It thus differs from *ampelopsiella* in having the tips of the antennæ white and in other minute particulars. The case in which it pupates is elongate and narrow, a long ellipse; that of *ampelopsiella* is a short and wider ellipse, that of *viticordifoliella* is nearly oval, that of *isabella* a very wide oval, almost circular, and that of *cornifoliella* is smaller than that of *isabella*, though resembling it more in shape than that of *viticordifoliella*, which is nearer to it in size. That of *nyssæfoliella* I have not seen. It requires careful observation to distinguish the species. They are more readily distinguished by their cases than by the markings of the imago. *Hydrangæella* and *ampelopsiella* may be distinguished at once from the others by the possession of the apical spot, but they require close observation to distinguish them from each other. So likewise do *isabella*, *nyssæfoliella*, *cornifoliella* and *viticordifoliella*. *Cornifoliella* and *isabella* are, however, of a duller, darker brown than the other two, and *viticordifoliella* likewise has white annulations towards the tips of the antennæ.

I have not seen any of the European species, but comparing our species with the figures of *Pfeifferella* and *Treitschkiella* in Nat. His. Tin., vii., the latter are much paler or lighter in color than our species.

NOTES ON NOCTUIDÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Chytonix palliatricula.

This species has the thoracic vestiture mixed with hair-like scales, and it agrees in all respects with *C. iaspis* as to structure and pattern of ornamentation. It differs from *Bryophila lepidula* in these respects and in that the abdomen is more strongly tufted. I have taken all these species in June and July in the vicinity of Buffalo.

Hadena quaesita.

Prof. Lintner's remarks in letters on the variability of *lignicolor* and his doubt, after seeing my type, of the validity of *quaesita*, induced me to take a large number of specimens this season; and though I have not taken one exactly like *quaesita*, I have a series which approach it so closely that I think it now only a pronounced example of that form of *lignicolor* which has the ground color of primaries very pale. The reddish tint is decidedly absent and the dark shades on terminal space and elsewhere contrast more strongly. The slight differences in the lines and stigmata are, I am satisfied, only varietal. The name *quaesita* applies then to the dark brown and pale form of *lignicolor*.

Hadena delicata.

I have taken a few fresh specimens of this species near Buffalo in June and July. The deep green shading is very beautiful and distinct on the thorax, base of the wing and to the subterminal line. I have since referred *H. interna* to this species, the type exhibiting the principal features of *delicata*, especially the inferior sinus of the subterminal line, but showing no green shades whatever, though comparatively fresh.

Mamestra vicina.

I have taken several specimens of this species near Buffalo, in July. I cannot separate satisfactorily from this species certain Texan specimens which I suppose to be the *teligera* of Mr. Morrison. The ovipositor is extended in one Texan ♀, in another not visible. I do not see it externally in *vicina*. Its visibility does not seem to me a satisfactory generic character, and in the series of *grandis*, *subjuncta*, *atlantica*, *vicina*, I would include the Californian *Mamestra pensilis*, formerly referred by me to *Dianthocia*, but apparently representing *vicina* in the western district.

Pallachira, n. g.

♂. Antennæ scaled on their upper surface with long setose pectinations outwardly; on the inside the processes are short, and from base to basal third much reduced; at this point the inner series is interrupted by a stouter claw-like process. Ocelli present; eyes naked; squamation scaly and thin. Legs slender, closely scaled, unarmed; hind tibiæ with two pair of spurs. Fore feet long and with the terminal joints tufted. Body slender; wings ample; abdomen exceeding secondaries.

I refer this genus to the Deltoids near *Herminia*. My single specimen in good condition has the fore feet so tufted that I cannot make out satisfactorily the form of the tibiæ and tarsi ; they seem to be aborted.

Pallachira bivittata, n. s.

Entirely pale ochrey, powdered with fuscous. A broad fuscous stripe below median vein from base to external margin. A second shorter stripe from the extremity of the cell outwardly. Else the entire insect is concolorous. *Expanse* 25 mil. Buffalo, July, coll. auct. The fore wings recall in color those of *Arsilonche Henrici*.

Agrotis trabalis, n. s.

♀. Fore tibiæ unarmed ; middle and hind pair spinose. Eyes naked. Thorax with a small tuft behind the collar ; behind with a divided tuftlet. Abdomen a little flattened, carinated, with a tuft on basal segment. Wings ample ; form rather stout. Whitish gray with large stigmata and bright brown contrasting subterminal space. A basal black dash, a second above it on the cell, before the orbicular, which latter is near the t. a. line, inaugurated above it on costa by two black lines rather wide apart, with white included space. Below the t. a. line is twice waved to internal margin. Basal space whitish ; basal line indicated. Sub-basal space dark gray. Stigmata concolorous, ringed with black, very large. Claviform incomplete ; orbicular a little flattened, ovate ; reniform moderately excavate. T. p. line narrow, geminate, regularly and slightly scalloped, with a deeper incision opposite the cell. Subterminal space rather wide, bright brown ; s. t. line faint, pale ; terminal space rather narrow, dark gray. A dentate black continuous terminal line. Hind wings pale gray fuscous, with pale fringes touched with blackish at extremity of veins ; a black terminal line. Beneath pale, powdered with dark scales ; an indistinct common outer line ; discal lunule filled in and prominent on hind wings, empty on primaries. Abdomen pale ; thorax gray, darker shaded on tegulæ. Second palpal joint outwardly black. Front white inferiorly below a frontal black line. The collar has no transverse black line, but is tipped with a darker shade. *Expanse* 42 mil. Mass. (Roland Thaxter).

A second specimen in poor condition, from Montreal (Couper), has the wings more obscure, the brown subterminal space improminent. In the type there is merely a black line inferiorly connecting the stigmata along the median vein. In the Canadian specimen the orbicular and reni-

form are connected also superiorly with a black line. The lunate discal mark beneath on hind wings is blackish, distinct and large; on the primaries empty in both specimens. The common exterior shade line on the primaries is even, on hind wings irregular.

Somewhat resembles the description of *A. fernaldi*, Morrison, but the fore tibiae are unarmed. Mr. Thaxter describes the type as from a "cocoon found under pine bark in April, when the larva had not yet become pupa. The cocoon was tough, not unlike that of *cerura*. Larva dull white with blackish markings."

Dryobota stigmata Grote.

♂. Larger than *mactata*, which it resembles in ornamentation. Eyes naked, tibiae unarmed, abdomen tufted along the dorsum. Antennae bipectinate, the pectinations gradually decreasing to the tips. Blackish brown tinged with olivaceous, especially on the subterminal space, and bright brown on the median space below the median vein. Lines black, narrow. Sub-basal space wide. T. a. line arcuate. Orbicular large, colorous. Reniform large, white, with a green stain. Median lines approximate below the middle and connected on the submedian interspace by a black dash. The reddish brown stain extends between the stigmata and colors the linear irregular median shade. T. p. line dentate superiorly, below vein 3 inwardly arcuate, and here touched outwardly with white. The light green subterminal shading stretches to apices, leaving the costal region of s. t. space dark with white dots. S. t. line faint. A terminal series of cuneate black marks. Hind wings fuscous with mesial line and pale transverse shades, reflecting the large filled dark lunate discal mark from beneath. Beneath pale fuscous, veins darker marked; on primaries the discal mark empty; three costo-apical white dots. Abdomen at the sides with reddish tuftings. Collar with a black line. Pectus purplish. Head and thorax somewhat olivaceous, the latter dark behind. Abdominal tufts blackish. *Expanse* 38 mil. *Hab.* Mass. (Thaxter).

The type has but little of the olive tints of this specimen, but it is not fresh; the markings are similar and I have no doubt it is the same species.

Caradrina bilunata, n. s.

♂. Wings ample. Eyes naked, body untufted. Body and fore wings pale mouse gray with distinct black lunate spot; other stigmata obsolete. Lines faint, wide apart, blackish, approximate at internal margin. Sub-

terminal space a little darker ; s. t. line indistinct. Hind wings white, a little soiled exteriorly. Beneath with distinct black dots on both wings. *Expanse* 30 mil. Hab. Newtonville, Mass., August (Thaxter).

This species is almost unicolorous pale mouse gray, with white hind wings and distinct black discal marks.

CORRESPONDENCE.

DEAR SIR,—

What is the nature and cause of the seeming growth on the eye of *P. philenor* and perhaps other butterflies? I have noticed in examining about 100 specimens of *philenor* that fully one-third of the number have on the eye near the proboscis a cluster of yellow tubes, varying from 3 to 40, and from one-twentieth to one-fourth of an inch in length. They are slender, about the diameter of a small insect pin, and are terminated by a mouth or cup-shaped appendage. I have found them in a few cases on *P. glaucus*, but never on any others. If you can not answer, I would be glad if one of your many subscribers would do so, and also give me the name of any work that may mention the peculiarity.

During a trip this summer I succeeded in obtaining several fine *Argynnis diana* females and a few males. For some reason the male was exceedingly scarce, though I saw quite a number of females, which had not as yet laid their eggs. In crossing the mountains (the line between N. Carolina and Tennessee) I noticed that *Neonympha arcolatus* was quite abundant in the valleys along the creeks, while *N. gemma* was found in any numbers above an altitude of 1,000 to 1,500 feet.

Lycaena comyntas with us lays its eggs on Rag-weed, the common garden nuisance. I found one doing so about six weeks ago ; there was white clover within five inches of where she was.

EUGENE M. AARON.

Maryville, East Tennessee, Sept. 12th, 1877.

[Can any of our readers throw any light on the question propounded by our correspondent regarding *P. philenor*?—ED. C. E.]

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No. 11

PIERIS VERNALIS A VARIETY OF PIERIS PROTODICE.

BY THOS. E. BEAN, GALENA, ILLINOIS.

Experiments and observations during 1874-5, supplemented by comparison of a large suite of specimens, seemed to invalidate the specific separation of *vernalis*. Submitting the facts to Mr. W. H. Edwards, he confirmed my opinion, and in the recently issued "Catalogue of the Diurnal Lepidoptera of America North of Mexico," he has placed "*vernalis*" as a variety of *P. protodice*.

The basis for my conclusion is briefly as below :

I. A BROOD FROM PROTODICE.

♀ taken August 15th, 1874. A *protodice* of normal summer form ; being of large size, with ample and dark markings on upper surface of wings and gray scales at base of primaries above, and showing yellowish and rather meagre shading beneath secondaries. This deposited eggs 21st August, which produced larvæ on 25th. Resulting imagines, seven, Sept. 15th. Two of these were not noticeably variant from usual *protodice* ; the remaining five were grades between *protodice* and *vernalis*, one female and four males ; the female and three males approximated *protodice* in varying degrees, and one male was nearer *vernalis* than *protodice* in size and marking.

2. A SERIES FROM COLLECTED LARVÆ.

In 1874, late in September and early in October, a large number of the caterpillars in various sizes were taken from naturalized mustard.

These were brought to the pupa stage with very slight loss, during October and early in November.

No parasites were observed in any stage.

The chrysalids were wintered in a cool room, with but little mortality.*

Imagines appeared 1875, April 14th to May 19th, females more abundant than males, about two to one.

None of either sex were of full size of *largest* captured examples of *protodice*, though several were but little inferior.

The series included scarcely a half dozen of the extreme *vernalis* type, and about an equal number of pronounced *protodice*; between these extremes ranged the large majority of the series, exhibiting a progressive set of intergrades. The prevailing tendency among the grades was towards *vernalis*.

Gradation occurred in regard to every observable point of difference between *protodice* and *vernalis*.

The larvæ from which this series resulted were all practically alike in markings; if any difference it was not perceptible. This larval uniformity seemed to affirm the specific unity of the diverse forms resulting—a conclusion much strengthened by the numerous intergrades.

3. COMPARISON OF CAPTURED SPECIMENS.

My collected set consists of *protodice* chiefly, a less number which are grades, and a very few of the *vernalis* type; the intergrades are amply sufficient to connect the extreme forms.

The butterfly is very rare in spring. About mid-June a few may be seen, a larger brood in July, and an abundant flight in August and September. After the middle of August usually the sequency of broods is more or less obscured, as each successive week shows an increased army of individuals; in scarce years, however, the regular accession of broods is evident.

Captures during June, July, August and early September are almost invariably true *protodice*. In September some grades appear, and with

* The favorable result of this experiment—say 67 butterflies from about 80 larvæ—as compared with the uniform extreme scarcity of *protodice* here in spring in state of nature, suggests that the species is imperfectly inured to our climate, and finds its proper *winter* conditions further south. Out of doors very few of the pupæ seem to escape our severe winters. The butterfly is extremely rare in spring (May), becomes more frequent by July, common and abundant in succeeding months. I have reason to think neither larva nor imago hibernate in this locality.

cool weather a very few *vernalis* also—these in late September and in October until severe night frosts occur. In autumn the grades of earlier dates are nearer the type: those appearing later progressively approach *vernalis*.

I would suggest that the term “dimorphic variety” hardly applies properly to *vernalis*. The variation is multiform, and the intergrade examples largely outnumber the instances of the extreme “*vernalis*” type as described and figured. *Vernalis* is not a variety abruptly contrasting with a type form, but merely the extreme term of a series of variations departing from type.

Vol. I of Mr. Edwards’ “Butterflies of N. A.” contains plate with accurate and beautiful figures of *vernalis*.

AN ACCOUNT OF SOME FARTHER EXPERIMENTS UPON THE EFFECT OF COLD IN CHANGING THE FORM OF CERTAIN BUTTERFLIES.

BY W. H. EDWARDS, COALBURGH, W. VA.

In May, of the present year, at Coalburgh, I bred a large number of larvæ from eggs laid by *tharos*, var. *marcia*; also several from eggs laid by *ajax*, var. *Walshii*; and from eggs laid by *Lyc. pseudargiolus*; and all of the chrysalids of *tharos*, and part of those of the other two species, were placed in small tin boxes as they formed, and at different intervals thereafter, 10, 20, 60 minutes up to some hours, and one and two days, were laid in the ice box on top of the ice. The box was supplied with ice once a day. I intended removing the chrysalids at irregular periods, so as to see what length of exposure to cold would suffice to change the form of the butterfly, and hoped also to ascertain how soon after the forming of the chrysalis the cold must be applied to produce the desired effect. But the *tharos* chrysalids had scarcely begun to form when I was called to New York, and had to leave charge of them and the larvæ to a member of my family, who followed my directions faithfully as to

placing the chrysalids on the ice at regular intervals. On my return some had been exposed ten days, others but one or two, and I at once removed them and waited to see the result. After six or seven days (which is the usual period of the chrysalis of this species in midsummer), the *tharos* butterflies began to emerge, and as one after another came out quite unchanged, I found that the experiment with them was a failure. A week later the *ajax* chrysalids began to give butterflies, and as they had been exposed to cold some days before I left home, and while I was attending to the ice box myself, the result was better. Some were fully changed, var. *telamonides* emerging instead of *marcellus*, as would have been the case in nature; others were but partially changed, having the shape of *marcellus*, but the broad crimson anal band of *telamonides*; and others were not changed at all, but emerged *marcellus*.

Later, one butterfly only emerged from the chrysalids of *pseudargiolus*, a female, and it differs curiously from the type, and from other examples of the same brood which have emerged from the chrysalids not exposed to cold, in that the common series of extra discal spots on under side is wholly wanting, and the marginal crescents form a complete series across both wings and are very large and black, so that these crescents are more conspicuous than in any example I ever saw in the field. The other chrysalids are most of them alive, but the butterflies will not appear before next spring.

The failure of the *tharos* to change led me to test the ice box, and I found that as the ice melted the temperature rose from 45° to 55° in the top of the box. Very likely, also, in my absence, the cover had sometimes been left raised in such a way as to admit air.

Fortunately I had brought back from New York another batch of *tharos* eggs, also of var. *marcia*, obtained in the Catskills, and the larvæ from these I bred in June and July, and placed the chrysalids in the ice box at intervals as before, but this time at the bottom, under the ice, where I found the temperature to be 33° . I had scarcely gotten the last chrysalids in when I was compelled to go East again, and so lost the opportunity of determining the length of time required to effect a change of form, and being detained by the late railroad troubles, I did not return till twenty days had passed. The same day I removed all the tin boxes from the ice. They contained more or less water, and in some was enough to drown the chrysalids.

I divided the chrysalids into three lots. No. 1 contained all which

were exposed to cold at from 1 to 9 hours after forming. No. 2 all at from 30 to 60 minutes after forming. No. 3 at from 10 to 30 minutes. But I discovered afterwards, by a label, that in this last lot were three chrysalids which had not been exposed till two days after forming.

The butterflies began to emerge on the seventh day, and by the ninth all had emerged that were alive. Fully one-half of the chrysalids were either dead or had just life enough to allow the bursting of the case without any expansion of the wings; and of the butterflies several were cripples. No doubt this loss and maiming was in part owing to the water in the boxes, but I think more largely to the tender age of the chrysalids when exposed, their surfaces yet unhardened being liable to injury. But the general result was satisfactory.

Of lot 1 (exposure 1 to 9 hours after forming) there emerged 9 perfect butterflies, 5 ♂, 4 ♀, every one changed. The males were what I call var. D of *marcia*, and though varying much in their under surfaces, were all like examples of the over-wintering brood (*marcia*) taken in the Catskills. Of the 4 females, 2 are good examples of var. C, *marcia*, and vary between themselves considerably, as is usual with that variety. But the other 2 are fine examples of "suffusion," the colors on either side blending, and the definite markings characteristic of the species being lost; also the black color of hind margins of upper side is hoary or griseous. These are such examples as collectors prize as the gems of their collections when taken in the field.

Of lot 2 (exposure 30 to 60 minutes) emerged 5 females, no males. Three are very little, if at all changed, but the other two are very pretty examples of suffusion, though to a less degree than the two before mentioned from lot 1, and the running of the colors is mostly restricted to the under side. The black margins on upper side are, however, much broader than in the normal form, running into and absorbing the extra discal round black spots.

Of lot 3 (exposure 10 to 30 minutes after forming, but with three chrysalids two days after) there emerged two females, no males. One of these I cannot distinguish from the summer *tharos*, and I presume this was from one of the three chrysalids spoken of, though of course I have no certainty of it. But the other is a beautiful example of var. B, *marcia*, the under side of the hind wings being largely melanized.

It would appear not to be necessary that cold should be applied before

the newly formed chrysalis has fully hardened to effect a change of form in case of *tharos*. Last year I found that chrysalids which were exposed at 9 hours after forming changed fully as much as those exposed at 6 and 3 hours. The temperature then was maintained at about 40° , and for 7 days only, and the changes were complete in nearly all the examples treated, but there was no case of suffusion, as has appeared in the present experiment at temp. 33° continued for 20 days; though probably the length of this last period had little to do with the matter, and a much shorter time would have produced the same result. Even with the first experiment this season as related, with an irregular temperature ranging from 45° to 55° and perhaps higher, though no change of form resulted, the cold completely retarded the development of the imago, as the butterflies did not emerge till their full period had passed after removal from the ice.

I think the facts I have stated throw light upon the cause, or a cause, of the phenomena of suffusion, instances of which are recorded in books and are occasionally seen in the field. Severe cold, as, for example, the enveloping of a chrysalis newly formed with ice or snow as it lies under a rock or on the ground, would apparently suffice to cause a blending of the colors in the butterfly.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

ADELA.

A. biviella Zell.

I have received both sexes of this species from Prof. Feraud, of Orona, Maine. It is a prettier species than *A. bella* Cham., with the fascia much more distinct. Zeller describes only the ♂. It has the head and palpi dark brown, with a very faint purplish tinge; the antennæ with annulations of dark purple and silvery white; the body and legs dark purple, the legs annulate with white; hind wings pale purplish with darker ciliæ; thorax and fore wings rich deep purple, appearing in some lights to be thickly

dusted with brightly scintillating golden scales ; behind the middle of the fore wings is a straight white fascia, widest on the dorsal margin, darker margined before, and more faintly so on the costa behind ; before the apex is another fascia which does not quite reach the dorsal margin, and which is dark margined before ; Zeller represents this fascia as having a sigmoid outline, but in one of my specimens it is perfectly straight, and in the other scarcely perceptibly sigmoid. *Al. ex.* 7 lines.

The ♀ (a single specimen), now first described, differs only in having the hairs of the head straw yellow ; those of the palpi whitish, and the second fascia reduced to a very short white costal streak. The antennæ are simple in both sexes.

A. bella Cham.

The fasciæ in this species are as stated in the original description in the apical part of the wing, only visible in certain lights and are very indistinct even then ; perhaps it would be more correct not to describe them as fasciæ, but to say that the apical part of the wings is somewhat suffused or overlaid with golden, except three or four narrow indistinct transverse lines, which are of the general hue. In the ♀ the basal half of the antennæ are densely clothed with long scales.

Dicte (Adela) corruscifasciella Cham., CAN. ENT., v. 5, April, 1873.

A. Schlaegeri Zell., Bei. z. Kent, May, 1873.

In my judgment the characters of this and similar species are sufficient to distinguish them generically from *Adela* as represented by such species as *A. bivittella*, *trigrapha*, *bella*, &c. Prof. Zeller's figure and description leave no doubt as to the identity of the species described so nearly at the same time respectively by him and by me.

Incurvaria mediotriatella Clem., Proc. Acad. Nat. Sci., Jan'y, 1860, p. 5.

Tinea auristrigella Cham., CAN. ENT., v. 5, p. 86.

I am satisfied that in *T. auristrigella* I have re-described Dr. Clemens' species, though I see no sufficient reason for separating it from *Tinea*. *T. iridella* Cham. will probably also be referred to *Incurvaria*.

PITYS.

P. fasciella, v. 5, p. III, ante.

The former description of this species is not satisfactory. I therefore re-describe it as follows :

Palpi silvery white ; the second joint of the labial pair has a narrow brown line extending along its outer surface ; face white ; vertex rufous ; antennæ pale fuscous. Thorax golden brown above and with a golden brown streak or spot beneath the fore wings, which are golden tinged with brown, and the costal and dorsal margins are brown ; before the middle are two large tufts of raised scales opposite to each other, the inner one brown and the outer one whitish or silvery gray, margined all around with brown, and there are two similar tufts in the apical part of the wing. There are seven small silvery white costal streaks, one before the first pair of tufts and another just behind it, and both pointing obliquely backwards. The third is smaller and placed just before the last two tufts, and is nearly perpendicular to the margin, and the other four are in the apical part of the wing ; there are also seven small dorsal silvery white streaks nearly opposite the costal ones, the third dorsal one (from the apex) connected faintly with its opposite costal one. Ciliæ pale fulvous. *Al. ex.* a little over $\frac{1}{2}$ inch. Kentucky.

XYLESTHIA.

X. Clemensella Cham.

The larva of this species bores in dead locust timber. It may be found abundantly emerging (as imago) from locust fence posts, about the middle of June, and is not uncommon as late as the first of August.

SEMELE.

S. cristatella Cham.

I find that I have occasionally referred to this species as *S. bifasciella*, by which name some of my specimens were labeled before it was published as *S. cristatella*. Probably there is not sufficient reason for separating it generically from the species placed by me in the genus *Pitys*. I am not sure but that two related species are confounded under this specific name, as in some of the species the wings seem a little narrower than in others, and, besides, have a golden spot or longitudinal streak within the costa near the base, and the tufts in the apical part of the wing margined with sordid white or yellow.

NOTE ON LARVAL VARIATION.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

In a paper on the Noctuidæ of North America (6th Ann. Rep. Peabody Acad. Sci.) I have stated that we should rather expect the acquirements of fresh character to be more apparent during the period of growth of the Lepidoptera. I have elsewhere (Bull. Buff. Soc., 1, 130) shown that there is proof in the excessive variation in the larvæ of a genus where the adults of the species are remarkably uniform in color and ornamentation, that the larva submits to independent and wide modification from the circumstances of its environment. Under this head I have suggested that all the cases in the Noctuidæ where the larvæ are very different and the imagos very similar of any two forms distinguished by geographical distribution (e. g., *Apatela psi* from Europe and *Apatela occidentalis* from America) may be ranked. And here the numerous cases cited by Gueneé from Abbot's drawings of the larva must probably be included. The case of these "representative" species is especially interesting and will receive in time a more thorough working out when we come to know the immature forms of more of our species.

In this first phase of larval variation we have the difference associated with a separate habitat.

In the next phase we have what Mr. Walsh calls a *phytophagic* variation of the larva. He has shown such to exist with *Hal. tessellaris*, and Mr. Hy. Edwards has shown it with regard to the Californian *H. Agassizii*.

Mr. Walsh's observations on *Sphingicampa distigma* and *Anisota bicolor* I have discussed some years ago, giving good reason to show that an error happened in the matter; the larva of his "*bicolor*" (♀ imagos) not having in reality produced the perfect insects with which he associated them. Hence the "generic" differences in the larvæ associated with "specific" identity in the imagos in this case assumed by Mr. Walsh do not in reality exist. But the phytophagic variation in *Halesidota* is not associated with a difference of habitat; and Mr. Walsh ascribes it to the food plant as the determining condition of the larval environment inducing the variation. The imagos cannot be distinguished.

We have again a third phase in the "species" of *Datana*. Here the variation in the larva is strong in the last moults, and the imagos though almost are not quite identical. The species may be separated without knowing the larva. The two nearest allied forms, *ministra* and *integerima*, have the one uneven, the other even fore wings. The larva of the latter is black with long silky white hairs, wanting in the former, which remains striped. It must be remembered that in an allied genus, *Nadata*, the two species are also separable by the differing margin in the imago; the larvæ are yet unknown. In *Catocala* we have two forms, *C. crataegi* Saund. and *C. polygama* Guen., quite distinct in the larval and very near in the perfect state.

I have briefly brought these facts together here to show that larvæ are independently subject to variation. The small differences in the imagos are usually attended by much greater differences in the larvæ in the case of closely allied "species." An analogy in the differences between closely allied species in different genera is shown in *Nadata* and *Datana*. We may expect similar facts when the history of our *Ceruræ* becomes known, all bearing on the objective basis for all our "genera" and "species," although certain lepidopterists continue to insist on real distinctions between certain of these artificial divisions. The conceptions of one class of naturalists are treated as corresponding with Nature, the other, not; but with insufficient reason.

NOTES ON THE EGG, LARVA AND PUPA OF SMERINTHUS MODESTA.

BY ROBERT BUNKER, ROCHESTER, N. Y.

Egg— $\frac{1}{16}$ in. diameter; light green, translucent, smooth, circular, oblate or depressed. Hatched in nine days from extrusion. Larva— $\frac{1}{4}$ in. long; light green, slender; head large, round, slightly depressed medially; face pink, with a purplish tinge; extremity of the body dark sea-green, with a large wart or tubercle, pyramidal in form, upon which rests the horn.

1st moult— $\frac{1}{2}$ in. long, apple green, with a light yellow longitudinal stripe below the dorsal ridge; diagonal lines yellowish white; horn purple, straight, very short. 2nd moult— $\frac{7}{8}$ in. long; $\frac{1}{8}$ in. diam.; rich dark green, finely granulated, giving it a beautiful velvety appearance; thorax adorned with two transverse crests or collars, studded with fine points tipped with white. 3rd moult— $1\frac{1}{4}$ in. long; $\frac{3}{8}$ in. diam., thickest medially; light green, otherwise unchanged. 4th moult— $1\frac{7}{8}$ in. long; $\frac{1}{4}$ in. diam.; light green, coarsely granulated, granules studded with fine white points, giving the skin a frosted appearance; crests on thorax much reduced in size. 5th moult—3 in. long; $\frac{3}{4}$ in. diam.; hind crest lost, anterior one much reduced; spiracles small, rust red; true legs brown; pro-legs brownish yellow; horn lost, except a mere rudiment; yellow longitudinal stripes very obscure.

Pupa 2 in. long; $\frac{5}{8}$ in. diam.; dark chestnut brown, cylindrical, holding its size well to the sixth segment, thence tapering abruptly and ending in a point or thorn; head obtuse, thoracic portion round, not angular.

The habits of the larva are singular; before the 1st moult it is much inclined to wander, and goes looping along after the manner of the Geometers; after the 2nd moult it becomes sluggish. It is a voracious eater—in short, an accomplished gastronome. Its manner of feeding differs from that of any larva I have had the pleasure of rearing. It rests with its body stretched out at right angles to the edge of the leaf, and eats with its feet fixed on the side of the leaf, and as the food is consumed moves backward, and when the leaf is consumed to the mid-rib, leaves it to try its gormandizing propensities on a fresh one. As the worm, while feeding, rests as above mentioned, the reason of its leaving the leaf half consumed will be obvious; it would otherwise have no surface to hold on to.

MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The Fourth Annual General Meeting of this Branch was held on Tuesday, 1st May, at 8 o'clock p. m., at the residence of H. H. Lyman, Esq., the President in the chair.

The following report was read and adopted :

REPORT.

Your Council beg to present the Fourth Annual Report of the Society's operations.

They would refer with pleasure to the satisfactory progress of the Society in the study of our science, evinced by the steadiness with which the monthly meetings have been kept up, and the interesting and valuable papers read at these meetings. Solid progress has been made in the identification and classification of the insects of Montreal, and much preliminary work has been accomplished, the value of which will appear hereafter. The only cause for regret is that our number continues so small, but the zeal and perseverance of the present members go far to compensate for their paucity in number. Your Council entertain the hope that at no distant day our membership will be augmented by the addition of at least a few more students of our useful and interesting branch of natural history.

Twelve meetings were held during the year, at which the following papers were read and presented to the Society :

G. J. Bowles—"List of Eggs and Larvæ Described in the Seven Volumes of the CANADIAN ENTOMOLOGIST."

H. H. Lyman—"Notes on the Occurrence of *Argynnis idalia*."

F. B. Caulfeild—"List of the Geometridæ of Montreal."

W. Couper—"On *Phyciodes tharos*."

H. H. Lyman—"List of Some of the Geometridæ of Montreal."

F. B. Caulfeild—"Notes on Some Species of *Chrysomelidæ* Occurring on the Island of Montreal."

F. B. Caulfeild—"Notes on the Species of *Meloe* in Canada."

H. H. Lyman—"Entomological Rambles, Including Notes on Entomology at the Centennial Exhibition."

G. J. Bowles—"The Noctuidæ of Quebec."

G. J. Bowles—"Notes on D'Urban's Paper in the *Canadian Naturalist*, Vol. v., with Identifications of the Species."

Some progress has been made during the year in the compilation of the "Montreal Catalogue," and the names of 790 identified species are now

entered on the list, comprising 385 Lepidoptera, 367 Coleoptera, 4 Diptera, 15 Orthoptera, 16 Hymenoptera and 3 Hemiptera. The earnest co-operation of the members is requested by your Council in this work. There is no doubt but that it will be of immense value to future students and will form a lasting memorial of our labors.

The finances of the Society have engaged the earnest attention of your Council. They would recommend that the cash on hand be expended in books for our Library, under the direction of the new Council.

The whole respectfully submitted.

GEO. JNO. BOWLES, President.

Montreal, 1st May, 1877.

The following were then elected to office for the ensuing year :

G. J. Bowles, President (re-elected) ; H. H. Lyman, Vice-President ; G. B. Pearson, jr., Secretary and Treasurer (re-elected) ; C. W. Pearson, Curator (re-elected) ; Council—F. B. Caulfeild, Robert Jack, W. Hibbins, jr.

After a pleasant conversation on Entomological subjects, and the examination of numerous specimens, the meeting adjourned.

G. B. PEARSON, JR., Secretary.

NOTES ON LEPIDOPTERA.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Scopelosoma Pettiti.

I have received from Mr. Fred. Tepper a fine and well marked specimen of this species, originally described by me (CAN. ENT., 7, 188) from specimens received from Mr. J. Pettit, of Grimsby, Ont. The new specimen, from Iowa, shows the continuous, even, diffuse and broad median shade very distinctly, running just inside the large reniform and absorbing its exterior orange annulet. The t. p. line has a costal angu-

lation and is otherwise even ; it shows black venular points ; the line itself is double and these black points contrasted with the pale yellow included space. The pale yellow s. t. line is thrice waved. This species is allied to *S. Graefiana*, from which it may be distinguished by its smaller size, its more even wings, which want the terminal festooned line, its paler ground color, straighter median shade, smaller orbicular spot and more prominent subterminal shade. The hind wings are very pale yellow and show a faint subterminal reddish shade in addition to the faint and more irregular mesial line. Beneath this subterminal shade is indicated by fragmentary reddish scales superiorly on both wings. In *Pettiti* the mesial line on secondaries beneath is more flexuous centrally.

Californian Hepiali.

Although Mr. Stretch, in his "Bombycidae of North America," gives *Behrensii* (fig. 6) as distinct from *montana* (fig. 7), large material, sent by Mr. Behrens, makes me believe that they are opposite sexes of the same species, which should retain the name *Behrensii*. The orange salmon-colored *Behrensii* seem to me the males, and specimens vary from the form described by Mr. Stretch, in which the insect is nearly concolorous, to the more usual form where two silvery fasciæ break the monotony of the wing. The bands composed of light colored spots are more or less visible in the males ; in the females (= *montana*) with fuscous wings, they are more evident. One intermediate specimen (♀) is faintly tinged with reddish. The hind wings have the margins and veins orange in *Behrensii* ; in the ♀ (*montana*) the wing is all fuscous, but this latter tint can be seen in the ♂ on the interspaces.

I have examined the species described by Mr. Behrens (CAN. ENT., viii., 174). I think that the specimen alluded to but not separately named under the description of *sequoiolus* is the female of that species, following out the idea that the sexes differ more than usual in *Behrensii*, to which *sequoiolus* is allied. The form described by Mr. Behrens as *Baroni* seems to me distinct and not the opposite sex of *mendocinolus*. It may be known by the bands remaining grayish fuscous, while the interspaces are shaded with red, not orange. But if the silver bands are a male character this opinion may need revision. The small species *Lenzi*, and the larger *sequoiolus*, can be readily recognised from Mr. Behrens' description of them ; while *mendocinolus* seems to differ from ♂ *Behrensii* by the smaller size, fuscous hind wings and less brilliant color of the primaries.

Lithophane viridipallens, n. s..

♂. Very pale gray green; allied to *querquera*. Thorax and head immaculate pale green with a central black thoracic dot, as in its ally. Lines on primaries faint. Basal dash obsolete. Lines double. Median shade continued, blackish. Reniform smaller than in *querquera*, more constricted, with a less conspicuous interior ring. Subterminal line much as in *querquera*, but without the median and submedian black marks of that species. Terminal series of dots reduced. Fringes concolorous. Hind wings fuscous with whitish fringes. Beneath pale with common line and discal marks, and an almost imperceptible flush. Abdomen pale fuscous, beneath very faintly ruddy. Hab. Mass. (Mr. Roland Thaxter). Size of *querquera*, but differing in the fainter markings, the narrower reniform, while the hind wings are less ruddy.

Syneda Alleni, n. s.

♂. A beautiful species allied to *graphica*, but distinct by the orange yellow secondaries and under surface. Band on hind wings narrow, twice deeply scalloped, angulated on vein 2, where it is joined to the base by black scales along the vein; thick discal lunule. Primaries like *graphica* but more brown; the median shade brown and diffuse; the t. p. line notched below costa; the t. a. line running down to internal margin, slightly projected outwardly on submedian vein. Beneath bright orange yellow, with deep black bands joined and forming Y-marks on both wings. Larger than *graphica*, and a more striking species. *Expanse* 32 mil. Orono, Maine, Mr. Anson Allen, to whom the species is respectfully dedicated.

CATOCALÆ TAKEN AT SUGAR AT CENTER, N. Y.

BY JAMES S. BAILEY, M. D., ALBANY, N. Y.

The following list will show the order in which Catocalæ were taken during July and August, 1877, at sugar, and the number taken each day of each variety, in this particular locality. Center has proven itself rich in Diurnals, and now especially so in Catocalæ. It is singular, after working up the field thoroughly for several years, not a vestige of a Cato-

cala has before this year been seen by the writer. In fact their presence was doubted, until this season a caterpillar was seen. June 28th the first *Catocala* was captured (*C. Clintonii*), and now, Sept. 12th, worn specimens of *antinympa* are seen, and good specimens of *relicta*, *amatrix*, *unijuga*, *habilis* and *cerogama*. The 10th of this month I took 22 *relicta* and 12 *unijuga*.

JULY.

- 23rd, 5 ; 25th, 1 ; 28th, 22 ; 30th, 4 ; 31st, 20.
1. *C. Clintonii*—2nd, 1 ; 10th, 2 ; 19th, 2 ; 21st, 1.
 2. " *polygama*—7th, 1 ; 11th, 1 ; 16th, 2 ; 17th, 2 ; 18th, 3 ; 20th, 1 ; 21st, 2 ; 23rd, 1 ; 30th, 1.
 3. " *var. pretiosa*—3rd, 3 ; 4th, 4 ; 5th, 1 ; 9th, 1 ; 10th, 5 ; 11th, 1 ; 12th, 2 ; 14th, 1 ; 16th, 7 ; 17th, 1 ; 18th, 3 ; 19th, 3 ; 20th, 1 ; 23rd, 2 ; 25th, 4.
 4. " *gracilis*—2nd, 3 ; 3rd, 8 ; 4th, 2 ; 5th, 13 ; 11th, 49 ; 12th, 45 ; 13th, 35 ; 14th, 30 ; 16th, 40. Abundant from 17th to 31st.
 5. " *var. similis*—13th, 5 ; 14th, 12 ; 16th, 28 ; 18th, 18 ; 19th, 31 ; 20th, 30 ; 21st, 52. Abundant from 23rd to 31st.
 6. " *ilia*—7th, 1 ; 9th, 1 ; 10th, 3 ; 11th, 1 ; 14th, 4 ; 16th, 2 ; 17th, 1 ; 18th, 6 ; 19th, 3 ; 20th, 6 ; 21st, 7 ; 23rd, 1 ; 25th, 1 ; 28th, 3 ; 30th, 2 ; 31st, 2.
 7. " *unijuga*—7th, 1 ; 12th, 2 ; 17th, 1 ; 18th, 2 ; 19th, 1 ; 20th, 4 ; 21st, 1 ; 25th, 2.
 8. " *epione*—9th, 1 ; 19th, 2 ; 20th, 1 ; 21st, 1 ; 28th, 2 ; 30th, 1.
 9. " *briseis*—11th, 2 ; 12th, 2 ; 13th, 4 ; 14th, 4 ; 16th, 1 ; 18th, 5 ; 19th, 4 ; 20th, 15 ; 21st, 21 ; 23rd, 13 ; 25th, 4 ; 30th, 8 ; 31st, 5.
 10. " *antinympa*—11th, 1 ; 12th, 2 ; 13th, 4 ; 14th, 6 ; 16th, 3 ; 18th, 4 ; 19th, 13 ; 20th, 12 ; 21st, 33 ; 23rd, 27 ; 25th, 56 ; 28th, 4 ; 30th, 93.
 11. " *concupiens*—14th, 1 ; 20th, 5 ; 21st, 6 ; 23rd, 2 ; 25th, 7 ; 28th, 1 ; 30th, 57.
 12. " *ultronia*—11th, 1 ; 12th, 1 ; 14th, 1 ; 16th, 1 ; 18th, 5 ; 19th, 1 ; 20th, 2 ; 21st, 5 ; 23rd, 3 ; 25th, 5 ; 30th, 6 ; 31st, 2.
 13. " *praeclara*—12th, 1 ; 13th, 1 ; 14th, 1 ; 18th, 1 ; 19th, 2 ; 20th, 1 ; 21st, 1 ; 23rd, 7 ; 25th, 12 ; 30th, 16.
 14. " *crataegi*—12th, 1 ; 14th, 1 ; 17th, 1 ; 21st, 2.
 15. " *relicta*—12, 2 ; 17th, 1 ; 18th, 3 ; 19th, 4 ; 20th, 6 ; 21st, 4 ;

16. *C. androphila*—16th, 1 ; 18th, 4 ; 19th, 6 ; 20th, 6 ; 21st, 20 ; 23rd, 9 ; 25th, 16 ; 28th, 24 ; 30th, 30 ; 31st, 45.
17. " *grynea*—17th, 1 ; 18th, 3 ; 19th, 4 ; 20th, 1 ; 21st, 1 ; 25th, 2 ; 28th, 6 ; 31st, 2.
18. " *minuta*—18th, 2 ; 21st, 1.
19. " *var. parvula*—19th, 1.
20. " *Meskei*—18th, 2 ; 20th, 1.
21. " *coccinata*—18th, 1 ; 20th, 1 ; 21st, 1 ; 28th, 1.
22. " *parta*—19th, 1 ; 20th, 1 ; 28th, 1 ; 30th, 1 ; 31st, 2.
23. " *tristis*—20th, 1.
24. " *insolabilis*—20th, 1.
25. " *fratercula*—20th, 1 ; 23rd, 2 ; 25th, 2 ; 28th, 3 ; 30th, 1 ; 31st, 1.
26. " *var. " (suffused)*—20th, 1 ; 23rd, 1.
27. " *palaeogama*—20th, 1.
28. " *var. phalanga*—20th, 1.
29. " *cerogama*—25th, 1 ; 28th, 1 ; 30th, 3.
30. " *residua*—25th, 1 ; 28th, 2 ; 30th, 2.
31. " *piatrix*—28th, 1.
32. " *resecta*—30th, 1.
33. " *habilis*—30th, 2.
34. " *var.*—31st, 1.
35. " *faustina*—31st, 1.
36. " *cara*—31st, 1.

AUGUST.

1. *C. concumbens*—1st, 3. Abundant from 3rd to 31st.
2. " *androphila*—Abundant throughout the month.
3. " *antinympa* " " "
4. " *ilia*—1st, 1 ; 7th, 1 ; 10th, 1.
5. " *habilis*—1st, 1 ; 3rd, 2 ; 4th, 1 ; 7th, 6 ; 8th, 8 ; 10th, 6 ; 13th, 8 ; 18th, 2 ; 20th, 11 ; 22nd, 4 ; 24th, 3 ; 27th, 5 ; 29th, 3 ; 31st, 6.
6. " *ultronia*—1st, 1 ; 3rd, 1 ; 6th, 1 ; 7th, 1 ; 10th, 1.
7. " *polygama*—1st, 1 ; 3rd, 2 ; 20th, 1.
8. " *residua*—1st, 2 ; 3rd, 2 ; 4th, 2 ; 7th, 2 ; 10th, 6 ; 13th, 1 ; 20th, 2 ; 24th, 1.
9. " *piatrix*—3rd, 1 ; 7th, 1 ; 18th, 3.

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10. *C. relictæ*—3rd, 2 ; 4th, 1 ; 6th, 8 ; 7th, 13 ; 8th, 7 ; 10th, 42 ; 13th, 28 ; 18th, 11 ; 20th, 17 ; 22nd, 26 ; 24th, 43 ; 27th, 30 ; 29th, 37 ; 31st, 34.
11. “ *briseis*—3rd, 1 ; 6th, 1 ; 7th, 3 ; 8th, 1 ; 10th, 4 ; 13th, 1 ; 18th, 3 ; 22nd, 3 ; 31st, 2.
12. “ *cerogama*—3rd, 2 ; 4th, 3 ; 7th, 6 ; 8th, 1 ; 10th, 14. Abundant from 13th to 31st.
13. “ *cara*—3rd, 1 ; 4th, 1 ; 7th, 2 ; 8th, 2 ; 10th, 7 ; 13th, 1, 27th, 5 ; 29th, 1 ; 30th, 1.
14. “ *amatrix* *var. nurus*—4th, 1 ; 6th, 1 ; 22nd, 1.
15. “ *unijuga*—6th, 1 ; 7th, 1 ; 10th, 1 ; 22nd, 3 ; 31st, 13.
16. “ *epione*—6th, 1 ; 10th, 1.
17. “ *præclara*—6th, 8 ; 10th, 6 ; 22nd, 3 ; 29th, 1.
18. “ *palæogama*—7th, 1 ; 13th, 1 ; 29th, 2.
19. “ *var. phalanga*—7th, 2 ; 27th, 2.
20. “ *relecta*—10th, 2 ; 13th, 1 ; 18th, 2 ; 27th, 4 ; 29th, 7 ; 31st, 5.
21. “ *amatrix*—18th, 1.
22. “ *desperata*—18th, 3 ; 20th, 4.
23. “ *obscura*—20th, 1.
24. “ *subnata*—20th, 1.
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CORRESPONDENCE.

WHAT IS THE FUNCTION OF THE FORCEPS IN FORFICULA?

DEAR SIR,—

In looking at the authorities upon this subject, I find that Westwood says “they are weapons of offence and defence,” but he gives no proofs. De Geer tells us “quand quelqu’ autre insect approche du Perceoreille, il tache de le pincer avec cet instrument en courbant le ventra en haut ou vers le côté, *mais sans produire beaucoup d’effet.*” That I can readily believe. Serville says “cette pince lui sert d’arme défensive, *quoique peu redoutable !*” That is also true—*peu redoutable—très peu !* The consistence of the forceps renders them by no means a formidable weapon. But De Geer also says, “Le male s’approche à reculons de la femelle dont

il tâte le ventre avec sa pince pour rencontrer l'endroit par ou il doit s'unir à elle, &c." This is a more reasonable use of the instrument, but not the only nor most important one.

Last summer I had a good opportunity of observing the habits of this insect, for every night numbers of them came into my study window in the country, and lighted very conveniently upon the table at which I was writing. Each one of them, before he took flight, for they were active, would bend his body back and *lift up the short elytra with his forceps before the wings would expand*, and this they did invariably. They would do this a dozen times in as many minutes, and not one of them ever took flight without performing this manœuvre. The forceps were not used to fold the semicircular wings, but only to elevate the wing covers before flying. I have examined a number of writers upon *Forficula*, but not one of them mentions this remarkable fact, which I observed for many consecutive nights, and I have no doubt of the truth of it. This, then, I believe is the real and perhaps only function of the instrument.

JNO. G. MORRIS, Baltimore.

EREBUS ZENOBIA.

DEAR SIR,—

On the night of the 6th of September, 1877, George C. Thomas took near Racine, Wis., a fine male *Erebus zenobia* Cram. On the night of the 15th of September I captured, in similar condition, a female of the same species. So far as I can learn, there is but one other instance of this species being taken in North America. H. Strecker says that one specimen was taken at or near Davenport, Iowa, several years since. The taking of this West Indian species at Racine is but adding another to the numerous instances where Southern forms visit us. I have repeatedly called attention to this peculiarity of the Racine fauna. Southern forms go much further north than they do east of the great lakes; especially is this true of birds and insects.

I send a photograph of the ♂. Expands 5 inch; ♀ 7 inch.

P. A. HOY, M. D., Racine, Wisconsin.

[We are greatly indebted to Dr. Hoy for the photograph of this rare and very interesting insect.—ED. C. E.]

FOOD PLANTS OF *H. MAIA*.

DEAR SIR,

I am reminded by Robert Bunker's remarks on the food plant of *Hemileuca maia* (p. 119 of current volume of CAN. ENT.) that in 1874, in a circular issued from the Department of Public Instruction of the State of Illinois, I wrote the following :

"Our savants in Entomological lore give Oak, Willow and Spiraea as usual food plants for the larvae of *Hemileuca maia*, but here, on or near these spacious marshes [along Calumet River, south of Chicago] these plants are scarcely abundant enough to warrant so numerous an array of the perfect insect. The unavoidable inference, therefore, is that either some other food plant is specially abundant in the locality, or else some other feature of the neighborhood which, perhaps, has hitherto escaped the attention of Entomologists, constitutes to them a strong attraction."

The tract of country alluded to is just such a swampy locality as Mr. Bunker speaks of in his communication. No doubt the list of food plants for these larvae is yet far from complete.

O. S. WESTCOTT, Racine, Wis.

DEAR SIR,—

From among numerous fine captures during this last season I mention the following as being of especial interest to many collectors, as they were taken in the Township of Roselle, New Jersey :

Sept. 1st—*Catocala marmorata*, *relicta* and *unijuga*. The former was resting upon a white oak.

The following Sphingidæ in larval form are secured; the first is of exceeding great rarity : *Smerinthus astylus* and *myops*; *Cressonia juglandis*; *Darapsa versicolor*.

GEO. W. PECK, 226 Pearl St., New York.

DEAR SIR,

I would suggest that the "seeming growth" observed by Mr. Aaron on the eye of *P. philenor* is nothing but the pollen of the flowers visited for honey by the butterfly. In this way Darwinists believe that cross-fertilization is effected in many plants, and they show also that such cross-fertilization is beneficial to plants.

A. R. GROTE, Buffalo, N. Y.

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No 12.

THE

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VOLUME IX.



EDITED BY

WM. SAUNDERS,

LONDON, ONTARIO

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The Canadian Entomologist.

VOL. IX.

LONDON, ONT., DECEMBER, 1877.

No. 12

A FEW COMMON WOOD-BORING BEETLES.

BY THE REV. C. J. S. BETHUNE, M. A., PORT HOPE, ONT.

Our Canadian wood-boring beetles, with the exception of a few somewhat minute species, belong to the two great families of Buprestidæ and Cerambycidæ. These include an immense number of different genera and species ; in Crotch's List of the Coleoptera of North America (north of Mexico) there are enumerated the names of no less than 169 species of the former family and 552 of the latter ; about one-third of these are found in this country. It is evident, then, that to give a bare list of all our Canadian species of wood-borers would occupy no little space, while a detailed description of them, if one were competent for the task, would fill many numbers of this journal. We propose, therefore, on the present occasion to merely give a brief account of the eight species depicted on the accompanying plate. These we have selected on account of their frequent occurrence in almost all parts of the country, and the consequent familiarity of their appearance even to non-Entomologists. Our readers will, we are sure, be pleased with the beauty of the figures, which have been admirably drawn upon stone by Mr. L. Trouvelot, of Cambridge, Massachusetts.

Taking the species in the order in which they are numbered on the plate, we come first to

1. *Monohammus scutellatus* Say—A Pine Borer.—This beetle, which derives its specific name from its conspicuously white scutellum, is of a shining black colour on both the upper and under surfaces, thickly punctured with irregular impressions ; on the wing-cases there are, as shown in the figure, a number of scattered whitish spots of various shapes and sizes ; these, on close inspection, are found to be composed of dense

short white hairs, which often become rubbed off and disappear ; the thorax is armed on each side with a thick triangular spine ; the antennæ are many-jointed, and about the same length as the body in the male, while in the female they are about twice that proportion. The size of the beetle varies from less than half an inch in the male to over three-quarters of an inch (exclusive of the antennæ) in the female. The larva is a large thick white grub, destitute of legs, divided into a number of well-marked segments ; the head armed with a strong pair of jaws. The larva infests the Pine, after the timber has been cut or newly fallen, and often causes serious injury to it by boring large oval-shaped holes which extend for long distances through the interior of the log. The perfect insects appear in June, and are sometimes very abundant ; we have occasionally found them swarming in great numbers on fallen pine trees. The insect is common throughout Canada and the neighbouring States.

2. *Clytus speciosus* Say (genus *Glycobius* Lec.)—The Maple Borer.—The colours of this remarkably handsome insect are deep velvety black and bright yellow. The figure represents its shape and markings so accurately that further description is unnecessary ; the size depicted, however, is decidedly above the average. This wasp-like beetle is not very abundant, but may occasionally be found on Maple trees, which its larvæ infest both when growing in the forest and also when cut into cord-wood. The eggs are laid by the parent beetle on the trunk of the Sugar-maple during the middle of summer ; when hatched the grubs penetrate through the bark and make long winding borings through the solid wood. Occasionally they are very destructive to young Maple trees, but on the whole they are not sufficiently numerous to be objects of dread.

3. *Orthosoma cylindricum* Fab.—A Pine Borer.—This large beetle is the commonest and best known of our wood-borers ; its habit of flying through open windows into lighted rooms during the warm evenings of July, usually to the great alarm of the inmates, has caused its appearance to be very familiar to every one. It is one of our largest beetles, measuring oftentimes as much as an inch and a half in length by over a third of an inch in breadth. Its general colour is a chestnut brown, approaching black on the head and antennæ. The thorax is armed with three sharp spines on each side ; each wing-case has three slightly elevated ridges running lengthwise for nearly the whole length ; the eyes, which are

situated behind the antennæ, are enormously large and very conspicuous. The larva is a large fat white grub, with powerful jaws of a darker colour ; it feeds upon the wood of the Pine, and from its size often injures the timber very materially.

4. *Clytus robinie* Forst.—The Locust tree Borer. (The synonymy of this insect has been rather perplexing ; it is now included in the genus *Cyllene* Newm. : for a long time we were accustomed to call it *Clytus flexuosus* Fab., but the specific name given above has the priority. It was also long considered to be identical with *C. pictus* Drury, that bores into the Hickory, but the late Mr. Walsh proved satisfactorily that the two species are distinct.)—The general colour of this insect is deep black with light yellow stripes ; on the head and thorax these stripes form narrow transverse bands, but on the wing-covers there is first of all a narrow yellow anterior edging (not shown in the figure), then a slightly flexuous stripe (not straight as in the figure) ; this is followed by a narrow zig-zag band forming a letter W across the wings, and three irregularly wavy and broken stripes ; there is also a yellow dot at the tip, and broader stripes on the sides of the abdomen of the same colour. The antennæ are long and many-jointed, and of a dark brown colour ; the legs are long and of a tawny hue. The larva is a whitish coloured grub, about an inch long and the thickness of an ordinary goose-quill, and is furnished with six very minute legs. When young it appears to bore chiefly into the sap-wood, but afterwards strikes off into the solid wood of the tree, perforating it in every direction. Its presence is early indicated by the little heaps of saw-dust extruded from the holes, and accumulated about the base of the tree.

The history of this insect is rather a curious one. For a little over a hundred years it has been known to inhabit the State of New York, its appearance and habits being recorded by some English Entomologists of the last century. About thirty years ago it was found as far west as Chicago, whence it spread throughout the State of Illinois, but it was not till 1863 that it reached Rock Island, about 200 miles further west, where—Mr. Walsh relates—it suddenly appeared in great swarms and utterly destroyed all the Locust trees. The first record we have found of its appearance in Canada is by Mr. Couper, who states (*Can. Journal*, 1855, p. 377) that he observed some Locust trees attacked by this insect in Montreal in September, 1855. In 1862 it began to be very destructive to the Locusts in Toronto, and for several years was excessively abundant

there. In 1873 Mr. Reed relates its appearance in enormous numbers at London, Ont. ; now it appears to be generally distributed throughout this province, and occasionally becomes very injurious to these ornamental trees. The perfect insect, in the localities it frequents, may usually be found in September on the flowers of the Golden-rod (*Solidago*), of which it eats the pollen, as well as upon the trunks of the trees it infests.

5. *Chrysobothris femorata* Fab.—An Apple tree Borer.—This insect belongs to the family Buprestidæ, while all the others on our plate pertain to the Cerambycidæ ; the difference in shape and structure, and especially in the length of the antennæ, is very noticeable in the figures. The beetle, which may be found basking on the tree-trunks in the hot sunshine in the end of June or during July, is very lively when danger threatens and will take wing instantly if an attempt is made to catch it. Its blackish colour above so much resembles the bark of the tree that it readily escapes the notice of an ordinary observer ; but beneath it is of a beautifully burnished dark copper colour, looking as if it were made of metal ; beneath the wing-covers it is bluish. While the figure gives the shape of the insect very correctly, it much exaggerates its size, which seldom exceeds three-eighths of an inch ; the light spots on the wing-cover are also erroneous in being very much too conspicuous. The larva is a long flattened grub, with an enormously large flat head in proportion to the rest of its body. When first hatched from the egg it eats the soft sapwood of the Apple tree, but afterwards it bores into the harder interior. As it especially attacks young trees, it is often terribly destructive to newly-planted orchards.

6. *Saperda candida* Fab.—An Apple tree Borer.—This insect, which rivals the foregoing species in the injuries it inflicts upon Apple trees, is a pale-brown beetle with two chalky-white longitudinal stripes running from the head to the apex of the wing-covers ; its under side, legs and face are also chalky-white, and its antennæ a little darker ; its length is about three-quarters of an inch. The larva is of a pale yellow or whitish colour, with a brownish polished head and black jaws ; it is destitute of legs, but like other larvæ of the same family, it is enabled to move in its burrows by the contraction and expansion of its well-defined segments ; when fully grown it is about an inch long. It may readily be distinguished from the preceding species by its cylindrical and more symmetrical shape.

Thus far this most injurious insect has only been found in certain portions of this country, being very abundant in the Niagara district, and in the neighbourhood of Montreal and Quebec, but happily rare, or entirely absent, from almost all other parts.

7. *Monohammus confusor* Kirby.—A Pine tree Borer.—This fine beetle, which is especially remarkable for the extraordinary length of its antennæ, is, in our Pine regions, one of the most common and destructive of our insect enemies. Its general colour is an ashen grey, mottled with variable darker spots; the scutellum is white; there are also patches of whitish colour on the head, thorax and abdomen. These variations of colour, being due to a covering of very fine short hairs, which oftentimes are rubbed off, are not to be depended upon in the determination of the species. As in *M. scutellatus* (fig. 1), each side of the thorax is armed with a short thick spine. The length of the insect varies from three-quarters of an inch to an inch and a half—the average size being over an inch; the antennæ of the males vary in length from one and a half to three inches; those of the female are somewhat shorter. The larva is a large, white, somewhat cylindrical grub, destitute of feet. During the summer the female lays her eggs in crevices of the bark of the white and red pine, selecting for the most part timber that has been scorched by fire, or felled by the wind or the lumberman's axe; the larva when hatched soon eats its way into the wood, and before this period of its existence is closed it often burrows immense galleries through and through the solid interior. As it lives a long time in the larval state, the perfect insect is frequently only developed after the timber has been built into a house, and then suddenly emerges from its concealment to the great consternation of the inhabitants of the dwelling. The larva, when burrowing in the wood, makes a loud noise like the boring of an auger, which on a still night may be heard for a considerable distance. The species is very generally distributed throughout Canada and the Northern States; in the pine-growing regions it is often excessively abundant. The late Mr. E. Billings relates that he once saw a pine tree near Lake Clear, in the county of Renfrew, on which he calculated that there were at least three hundred individuals of this species, while numbers more were flying about in all directions. As the insect attacks the cut timber when left over summer in the woods, it is a very serious injury to the operations of the lumbermen of this country.

8. *Oberea tripunctata* Fab.—The Raspberry Borer.—We now come to the last insect on our plate ; the figure is a good deal exaggerated in size, the length of the beetle being under half an inch, and its width one-tenth of an inch. Its colour is deep black, with the exception of the thorax above and the front part of the breast beneath, which are rusty yellow ; on the thorax there are three small elevated black dots arranged in a triangle (not two only, as in the figure), whence is derived the specific name of the insect. The antennæ are nearly, if not quite, as long as the body. The beetles are usually found in July and the beginning of August ; they attack all the varieties of raspberry, and come into gardens from the fields and clearings, where we have often taken specimens and observed their work. The mode of attack is peculiar : the first appearance of injury is usually manifested by the withering and drooping of the ends of the young shoots. On inspection, it is found that at the base of the affected part there are two rows of punctures, half an inch apart, running completely round the canes, and so girdling them that the supply of sap is stopped and the tops necessarily soon wither and break off. The parent insect begins by cutting with its jaws a series of small punctures side by side around the cane, six or seven inches from the top. As soon as the first row is completed, it turns round, and facing the other way, cuts a second row measuring the length of its own body. These two girdles being completed, it makes a small hole a little way above the lower girdle and deposits in it its small yellow egg. The whole operation occupies an hour or more. From this egg there hatches out in a few days a small yellow footless grub, which proceeds to burrow downwards, eating the pith of the cane and eventually causing its destruction.

In order not to occupy too much space, we have forborne to make any mention of remedies which have been applied with more or less success to combat the ravages of these destroyers. Should any of our readers desire information upon this point, we beg to refer them to the Entomological Society's forthcoming Report to the Legislature, which will include many particulars regarding these insects which we have not given above.

AMERICAN ENTOMOLOGICAL SOCIETY—NOTICE OF REMOVAL.—The American Entomological Society has removed to the south-west corner of Nineteenth and Race Streets, Philadelphia, Pa., where all correspondence, &c., should be addressed. Chas. A. Blake is Corresponding Sec'y.

A NEW GENUS OF TORTRICIDÆ.*

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

In the early spring, from the middle to the end of April, Prof. Lintner and Mr. Hill have taken near Albany a rather small and inconspicuously colored moth, remarkable for its diurnal activity. At first sight I did not recognize it as belonging to the Tortricidæ, but on examination it shows the family characters and seems to be allied to the European genus *Cheimatophila*. But it is not vein 4. but vein 5 that is wanting on the hind wings, and the other characters sufficiently separate our species.

Exentera, n. g.

Sub-median vein of secondaries hairy above at base. Ocelli. Eyes naked. Antennæ of the male brush-like, of the female simple. Fore wings narrow, long, with parallel costal and internal margins; apices not produced; external margin short and even; 12 veined, all the veins separate; vein 1 furcate at base; 2 from median at two-thirds from the base; vein 7 joins the external margin below apex; 10 is thrown off nearly mid-way between 9 and 11. Hind wings 7-veined, 5 wanting; 6 and 7 from one point; 3 and 4 near together at base; 2 at three-fourths from the base of wing. Fringes moderate; ovipositor slightly exerted. Palpi bushy, third article moderate. Front hairy, thorax smooth, legs untufted.

Exentera apriliana, n. s.

♂ ♀. Concolorous, dark olivaceous fuscous, a little mottled, immaculate; hind wings smoky fuscous, sub-pellucid, paler beneath. Under the glass the fore wings and thorax are seen to be covered with whitish-tipped fuscous scales. Length of ♀ primary 11 mil.; length of ♀ body 9 mil.

* Prof. C. H. Fernald, Orono, Maine, is now engaged in the study of our N. Am. Tortrices, and I have relinquished to him my accumulated material for the purpose. I hope my friends will supply him with the necessary material to enable him to give us a full and much needed paper on the group.

SEXES OF HOMOPTERA LUNATA.

BY THOS. E. BEAN, GALENA, ILLINOIS.

For the purpose of further testing conclusions stated on p. 174 regarding *Homopteras lunata*, *edusa* and *Saundersii*, I have secured all observed at my sugar since the former writing.

There are 38 "*lunata*," 23 "*Saundersii*" and 18 "*edusa*." Having opportunity to examine these while fresh, I observed the anatomy of the sex organs in each specimen as captured. The result verified the view previously advanced—the *lunatae* were all females, the *Saundersii* and *edusæ* all males.

In regard to the wing-markings, the comment already printed applies equally to this lot of specimens; in addition I may say that there appears to be somewhat greater variation of t. p. line among the females (*lunatae*) than in the two series of males (*edusæ* and *Saundersii*).

A large proportion of these specimens—nearly one-half—were taken in September; of those obtained in previous years a majority were captured earlier in the season.

It will be noticed the numerical proportion between the sexes, and also between the two male forms "*Saundersii*" and "*edusa*," already printed, is pretty well sustained in the present lot. The proportion of about 4 "*Saundersii*" to 3 "*edusæ*" is perhaps a tolerable approximation to their relative abundance here, as it was during the past summer my aim to secure all observed.

A note from Mr. Grote advised examination of the frenulum. I have applied this test to each of the 162 specimens, with result confirming the conclusion already reached. This structure is uniformly simple in "*edusa*" and "*Saundersii*," and compound in "*lunata*."

NATURALISTS' DIRECTORY.—A new edition of this convenient publication is promised about May next. Besides containing as complete a list of the names of Naturalists as it is possible to obtain, it is to embrace a list of all the scientific societies in North America, their location, officers and active members. Any communications relating to this Directory should be addressed to S. E. CASSINO, Salem, Mass.

DESCRIPTION OF PREPARATORY STAGES OF NEONYMPHA
SOSYBIUS.

BY W. H. EDWARDS, COALBURGH, W. VA.

Egg laid July 16th, on grass, the female being confined in a bag over a tuft of grass set in a flower pot. Shape nearly that of a semi-ovoid, the base being flattened and the sides at base rounded, the surface under a low power smooth, but under a higher seen to be covered with shallow thimble-like depressions; color greenish-white.

Hatched July 20th.

Young larva—Length .09 inch.

Shape cylindrical, but marked by five or six longitudinal tuberculated ridges; each tubercle sending out a clubbed white hair, some of which are curved forward, others back; color white; head much larger than second segment, rounded, bilobed, rather broader than long, the vertices without processes, pilose, shining black. Duration of this stage 6 days.

After 1st moult—Length .2 inch. Shape cylindrical, thickest in the middle, tapering evenly either way, so that 2nd segment is of about same breadth as 12th; tail forked; color light green; covered with fine white tubercles, arranged in longitudinal rows, not quite regularly, each tubercle sending out a white hair; the space between the two dorsal rows is rather broader than between the rows elsewhere, presenting a clear green medio-dorsal stripe; and at extreme edge of dorsum is also a green stripe, but narrower; legs, pro-legs and under side green; head considerably broader than 2, rounded, a little depressed at top, angular at the sides below; color green, darker than body, much covered with fine white, pubescent tubercles; ocelli and mandibles brown. To next moult 7 days.

After 2nd moult—Length .36 in. Shape as before, and similarly marked, the tubercles of unequal size; the largest arranged in the longitudinal rows, but many small ones placed on the ridges caused by the creasing of the several segments; color blue-green; head no broader than 2, yellow-green, shaped and marked as before. To next moult 6 days.

After 3rd moult—Length .42 inch. Stout, thickest in the middle, rounding somewhat dorsally; color pale green; on either side of the

darker medio-dorsal stripe the row of white tubercles forms quite a broad stripe, another one at edge of dorsum, and another at base, over feet ; the head emerald green, shaped as before. To next moult 5 days.

After 4th moult—Length .56 inch. Without another moult this stage continued till maturity.

Mature Larva—Length .76 inch. Cylindrical, obese, thickest in the middle, rounded dorsally, and sloping slightly to 11, then rapidly to last segment, which ends in forked, divergent tails ; color emerald green, much covered with fine yellow tubercles placed on the ridges caused by the creasing of the segments, and with larger tubercles disposed in longitudinal rows ; each tubercle giving out a fine and short white hair ; at base of body the stripe is more heavily tuberculated than on dorsum ; on either side of a clear, dark green, medio-dorsal stripe is a tuberculated stripe, and another at edge of dorsum ; under side, legs and pro-legs, nearly same green as above ; head rounded, broader than high, bilobed, and but little depressed at the suture, somewhat flattened frontally, broader than 2, equal to 3 ; covered with yellow, conical, fine points, arranged in close vertical rows, and at same time in transverse rows also ; the ocelli black, mandibles brown.

The larva suspended in form of figure 6. Duration of this stage 7 days.

Chrysalis—Length .4 inch ; greatest breadth .1 inch. Cylindrical, the abdomen stouter than anterior portion ; mesonotum rounded, carinated ; the head case truncated, scarcely projecting beyond the mesonotum, slightly arched at top, narrow, beveled at corners ; the wing cases flaring a little on dorsal side, the venuration of wings seen distinctly ; color green, on the abdomen yellow-green ; on either side of dorsum on abdomen is a small ridge, and on either side of this are three black dots, placed in pairs between the mesonotum and extremity ; on either side below wing cases a brown stripe ; the keel of mesonotum brown, and the wing cases are crooked along the principal nervures, and on the margin is a black dot at the end of each nervule. Duration of this stage 13 days.

This species is very common in this part of West Virginia, and is found over the Southern and Southwestern States and in Mexico. Here it is two brooded. It flies in company with *gemma* and *eurytris*, keeping within the edge of the forest, or if in the open country, is always near timber. The egg is shaped very much like that of *eurytris*, but still more

like the eggs of certain *Papilio*s, *turnus* for instance, but is netted on surface like the former and unlike the latter. It is quite different from the egg of *nephela*, and the egg of *gemma* is globular. The young larva is very different from that of *nephela*, but as it passes its several stages the larva grows surprisingly like the corresponding stages of *nephela* both in shape and color, while at every stage it is very unlike *gemma* in these respects. It is less like *eurytris* in shape than *nephela*. On the other hand, the chrysalis is very like that of *eurytris*, wholly unlike that of *gemma*, and pretty near that of *nephela*. In these preparatory stages its affinities are with *eurytris* in egg and chrysalis, with *nephela* in larva, and as unlike *gemma* in larva and chrysalis as if the latter were an *Apatura*.

INSECTS FEEDING ON GLEDITSCHIA.

BY V. T. CHAMBERS, COVINGTON, KY.

Helice pallidochrella Cham., and *Agnippe biscolorella* Cham.

My observations on both of these species scarcely permit me to doubt that their larvæ feed in some way on the Honey Locust (*Gleditschia tricanthos*), though neither of them has been bred from the larva. I have, however, met with a larva from which I have not succeeded in breeding the imago, and which I believe to be the larva of one of these species. It is a *Gelechia*-like larva, about half an inch long, with sixteen feet, and feeds inside the seed-pods of the *Gleditschia*, on the honey-like substance found in them, and not, so far as I have observed, on the seed. Its head is very pale ferruginous, the other segments being of a pale apple green, with very indistinct darker spots. I have met with it in September and October, but have never found it in the old pods in the spring, wherefore I think it probable that it leaves the pods to pupate. It is most probably the larva of *H. pallidochrella*. This species will be considered—and is—a *Gelechia* in the wide sense—the sense in which it is a convenient receptacle for every species that cannot be better disposed of.

And as I had previously described a very different species as *G. pallidochrella*, I suggest for this species the specific name of *gleditschiælla*.

While upon the subject of species feeding on *Gleditschia*, I wish to call the attention of Coleopterists to two species of Buprestidæ which feed upon this tree. I have never bred either, and have met with each only once, one of them in the larval, the other in the pupal condition. The larva, which resembles that of a *Brachys* more closely than it does that of any other genus known to me, feeds inside the thorns, and is about $1\frac{1}{4}$ lines long. It is depressed and narrows rapidly from the third segment back to the tenth, the remaining segments being again dilated.

The other species feeds *in* the seed. The only specimen that I have met with was a dead pupa found in a seed in May. The entire contents of the seed had been consumed, and the pupa fitted the pericarp so accurately that it looked as if the contents had been metamorphosed into the pupa—as in a sense they had—while the pericarp itself was intact. In breaking open the seed the pupa was somewhat crushed, and it may prove not to be that of a species of Buprestidæ, but I think it belongs to that family. The pupa having so nearly the shape and size of the bean or seed of the *Gleditschia* is about three lines long by two wide, and depressed. There is no danger of mistaking the larva of *Laverna gleditschiælla* Cham. for that of either of these species.

In this connection I wish also to refer again to the very singular larva mentioned in the CAN. ENT., v. 8, p. 137, and to add to the account there given of it that the maxillæ are enormously developed and are used as aids to progression—not exactly as legs, perhaps,—but they are applied to the surface as if the insect was feeling its way with them. Their eyes are reduced to the merest points—indeed I am not sure that these points are eyes—and enclosed in the darkness of the thorn it has more use for “feelers” than for eyes. *Laverna gleditschiælla*, however, which likewise feeds in the thorns, has the eyes well developed. The other larva tumbles about helplessly on a plain surface, being unable to walk on it. It requires a tubular place or cavity like the inside of the thorn, where by arching its body the dorsal tubercles can be brought to bear on one surface, while its ventral legs bear on the opposite one, and then it progresses easily enough. Using what is called the live-box or animalcule cage by microscopists, placing the larva between the glass and its brass setting, it courses around actively, using its dorsal tubercles as legs. I have never succeeded in rearing it, and do not know to what order it should be referred.

Laverna gleditschiella Cham. is much subject to the attacks of hymenopterous parasites in its larval condition. Yet it is difficult to understand how this is possible under the conditions of its larval life. The first traces of the larva are always found *in the pith* of the stem or branch of the tree, about an inch from the base of the thorn. I have never been able to understand how the larva gets to the pith without leaving some trace of its path from the outside of the stem. The egg must be deposited on the outside of the stem, because the ovipositor of the ♀ is too soft to be able to penetrate the bark and wood to the pith. It would seem that the eggs of the little chalcid parasites must be deposited on the microscopic larva of the moth as soon as it emerges from the egg, and before it has eaten its way into the branch, because it is impossible to understand how it can be done afterwards, as these little parasites are themselves so small that two of them placed end to end would not extend from the outer surface of the bark of the twig to the central pith, and their ovipositors are very short and not exerted. By some means, however, they do manage to reach the larva, and frequently in place of the lepidopterous larva one finds only its shrivelled integument and a dozen or more minute chalcid pupæ, looking as if they were plaited together so as to form a chain as long as the larva of the moth. Sometimes, too, one finds the imagines which have not been able to effect their egress, however they may have effected their ingress to the thorn. There are two other species of Chalcididæ sometimes found in a similar predicament, dead in the prison in which they were hatched. One of these in the imago state is about two lines long. I do not know whether these feed on the larva of the *Laverna* or on one of the other larvæ above mentioned. The *Laverna* larva eats its way to the base of the nearest thorn, usually about an inch distant, then up through its pith a short distance, frequently turning off into the nearest branch. It eats through nearly to the outer surface, leaving only the thin cuticle of the thorn, reaching this point in May, the egg having been deposited on the twig about July or August of the previous year. Here it enters the pupa state, and in ten days or two weeks the imago makes its appearance, the empty pupa skin being left projecting from the little circular hole where it has burst through the cuticle of the thorn. The imago is almost unicolorous, but it ranges from deep glossy brown very faintly bronzed, to a bright bronze or almost golden brown.

Dr. Schweinfurth mentions (*Heart of Africa*, v. 1. p. 98) and figures the thorns of an African *Acacia* which have a large swelling at the base

produced by some insect, with the little orifice from which it had emerged very much like that made by *Laverna gleditschiæella* in the thorns of the Honey Locust. The *Laverna*, however, produces no swelling of the thorn. On a journey previous to that detailed in the *Heart of Africa*, Dr. S. had planted in Cairo seeds of an Acacia which he had gathered in equatorial Africa. On his later journey these seeds had produced trees which bore thorns in which were the same swellings and the hole by which the insect had emerged, and the Dr. suggests the query whether the insect had survived in the seed!! or "how did it contrive to get to its tree in Cairo?" The idea is novel enough that the insect was carried in the seed which survived its ravages, and in spite of them produced a tree, while the insect having been planted in the seed, managed to make its way through all the stages of the growth of the tree for so many years, and finally emerged from its thorn. As Dr. S. states that "it also occurred in several other situations" beside that at which he planted seed, a more reasonable theory is that the insect was there before he planted the seed. He does not inform us what sort of an insect it was. He mentions also a musical sound produced by the wind blowing into the holes in the thorns from which the insects had emerged. No sound, however, is produced by this cause in the thorns of the *Gleditschia*.

I have been informed that thorns of various species of Acacia (in a large sense) in Texas, New Mexico and Arizona are perforated by insect borings similar to those of *Laverna gleditschiæella* in the Honey Locust, but I have not been able to procure specimens of the insect architect. Prof. Sumichrast mentions similar borings in Acacias in Mexico (referred to in a volume of the *American Naturalist*—I write from recollection and cannot refer to the volume or page). These, however, like those of which Mr. Belt gives such an entertaining account in "The Naturalist in Nicaragua," were tenanted by ants, and according to Mr. Belt, the excavations in the Nicaragua Acacias were made by the ants, which in return for the home and shelter afforded by the thorns, furnished a standing army for the tree, protecting it from depredations by other animals. Two species of ants—a *Myrmica* very near *M. molesta* Say, and a *Formica* (*F. dislocata*? Say) also inhabit the thorns of *Gleditschia triacanthos*; but I have not been able to learn that they render any sort of service to the tree, and certainly they do not excavate their own dwellings, but only appropriate dead thorns that have already been excavated by the larva referred to in the preceding pages—just as they might take advantage

of any other crevice or opening which promised the requisite shelter. The colonies of the *Formica* are much more numerous than those of the *Myrmica*, and the species varies so in color—from those in which the workers are of a dull dead black to those in which the thorax is of a honey yellow—that I at first thought there were three species. I became convinced, however, that there is but the one species. Each formicarium contained one ♀ and a number of larvæ, while the number of workers in some was less than a dozen; in others it rose to more than a hundred.

ON THE GENERA NOLA AND ARGYROPHYES.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

I have received from Canada (London, Mr. Saunders) a new and easily recognizable species of *Nola*, larger than *ovilla*, and in describing it, I have again gone over the characters of *Argyrophyes*, which I find to be allied to *Nola*, and not to belong to the *Geometridæ*. I have corrected my former observations on *Argyrophyes*, which I find to have been largely erroneous.

Nola sexmaculata, n. s.

♂ ♀. Fore wings with the apices produced, gray, like *ovilla* in color, crossed by three oblique dentate and very fine black lines. Costa at base marked with brown. Immediately beyond, at basal third, is a second brown mark, widening inferiorly on the cell. A third and larger, subquadrate, at the middle of the wing. These two last spots are seen to be very finely edged with white on the outside. Hind wings gray with white fringes and discal dot. Beneath sub-irrorate, fore wings gray, hind wings white with discal dot. *Expanse* 19 mil. Two specimens; in the male the antennæ are broken off; from what remains they do not appear to have been pectinate.

Argyrophyes Grote (Bull. B. S. N. S., 1, Plate v.)

The enlarged figures of the neururation (3, 2) I have given are incorrect and may mislead. I have made a fresh preparation of the wings according to Mr. Dimmock's method. The primaries are like Zeller's figure of *Nola confusalis* (fig. 43, a) except that the base of 6 is opposite 5 from the cross vein, as I have figured it. My diagnosis is correct except that for "9 from upper and outer angle of the cell to costa" it should read "just before the upper, etc.," and here my figure and description, which agree, are both wrong. Also 7 touches the costa just before the apex, not at apex. The hind wings differ from Zeller's fig. b, and agree with mine in that vein 4 is joined at right angles by a true vein to vein 3, and is nearer 3 than 6, as I have drawn it. My vein 4 is probably vein 5 of Heineman (1, 273). There is also one accessory internal vein on hind wings. I have referred the single species to the *Geometridæ*, but it should be evidently placed near *Roeselia* among the Lithosians. The neururation is so very variable among the European species that it might not be held generically distinct, but vein 5 is not thrown off from the middle of the cross-vein as given by Heineman for *Roeselia*, but is nearer 3 (4 wanting) than it is 6, and joined by a true transverse vein to the submedian, which is thus 3-branched, not as Zeller figures *confusalis*, 2-branched with 5 independent from the middle of the cell without a true connection with the submedian vein itself. I cannot now account for my errors in drawing the enlarged figures of *Argyrophyes*, except that the wings, which are very frail, were insufficiently cleared of scales, preventing me from getting an accurate view of the venation. The diagnosis given by me (l. c. 175) should be amended to read as follows :

Argyrophyes, n. g.

Ocelli wanting. Maxillæ short, concealed by the prominently long, very thickly scaled palpi, which exceed the front, their third article directed forwards. Wings full; primaries large with evenly arcuate costa, straight external, and consequently long internal margin; 10-veined; cell long, incompletely closed; 2 to 5 at decreasing intervals; 5 from the cross-vein near 4; 6 from the cross-vein near 4 and opposite 5; between 5 and 6 the cell is incompletely closed by an angulated fold; 7 to costa just behind apex; 8 out of 7 to costa; 9 just before the upper and outer angle of the cell to costa; 10 and 11 wanting. Hind wings rounded, 7-veined; cell incompletely closed; two internal veins counted as one;

median 3-branched; vein 4 wanting; 5 joined to median at right angles from a true vein, the commencement of the cross-vein; 6 and 7 together from a point beyond the closure of the cell; 8 out of 7 near the base. ♂ antennæ simple, scaled, ciliate beneath.

Argyrophyes cilicoides is chalk white; the basal half of primaries white; on the outer half of the wing the terminal portion of the median space is shaded with smoky, enclosing a raised blotch of black metallic scales at the extremity of cell. A waved smoky subterminal line dividing the white terminal field and very near the margin. Beneath the primaries are smoky except along internal margin at base. Hind wings white with a smoky shading within the fringes; beneath with a faint dot. Body white. *Expanse* 16 m. m. New Jersey. I find that my two specimens were males.

Very near to *cilicoides* is *Nola nigrofasciata* of Zeller, Taf. 2, fig. 1, but it is impossible that it is the same. The color of the band is "brown" and it occupies the middle of the wing, and is well defined in Zeller's figure. In *cilicoides* there is no middle band or median space, but the smoky shading is limited to the outer part of the median space without the usual place for the median shade line. The narrow exterior line is evenly arcuate to submedian fold. The white terminal fields are narrower than in *nigrofasciata*.

But I have a species received from Mr. Goodell, Amherst, Mass., the specimen numbered 602, which closely agrees with Zeller's figure and description except that it is a little larger (19 mil.). The median band is not quite separated at its submedian constriction, but this is an ordinary varietal character. Else it agrees perfectly. There is the dot on median vein at base and costal shade (entirely wanting in *cilicoides*), and the faint mark before the inception of the subterminal line. No doubt can remain on my mind that I have Zeller's species before me. Now this species has been evidently re-described by Mr. Morrison, Boston Proc., 154, 1874, as *Eustrotia obaurata*! But the palpi are the palpi of *Nola* and not of *Eustrotia*. They are rather the palpi of *Argyrophyes*, being longer than in *Nola* and with a more pronounced upward curve. The vestiture is wholly scaly and not like that of *Eustrotia*. And the ocelli are wanting. All doubt fades when we come to examine the neuration. It agrees precisely with *Argyrophyes*, and just in those points, accordingly, where *cilicoides* differs from *centonalis*. The median vein of secondaries is 3-branched, vein 4 wanting, vein 5 joined at right angles by a true vein

and nearer 3 than 6; vein 8 is thrown off near the base of the wing. A second species of the genus *Argyrophyes* will then be:

Argyrophyes nigrofasciata Zeller, Beitr., 1, 8, Tab. 11, fig. 1 (*Nola*), 1872.

Eustrotia obaurata Morr., Proc. Bost. Soc. N. H., 154, 1874.

My specimen is a female. Zeller describes and figures the male, which seems to differ unimportantly.

We have here two white species which seem to differ from all known species of the group in the squarer primaries, longer palpi, more rounded secondaries, and in the details of the venation. The ornamentation is remarkable for the metallic scales accompanying the discal spots.

In a forthcoming paper I hope to be able to give corrected drawings of the venation of *Argyrophyes*.

In describing *obaurata* Mr. Morrison does not mention the black dot at base of primaries, and he calls the median space "blackish gray"; Zeller calls it "brown." In the specimen before me it seems to have an olive cast; it would be described as "obscure olive-brown." The scattered metallic scales are very obvious. In Mr. Morrison's description I find no mention of the ante-marginal shade line. But the rest of the description is accurate, and I recognized this species from it in Mr. von Meske's collection at Albany.

ENTOMOLOGICAL PINS SEIZED FOR DUTIES.

For some years past our Society has kept a small stock of Entomological pins, not for the purpose of gain, but for the convenience of our members, many of whom, in the United States as well as in Canada, have obtained their supplies from us in small packages transmitted through the mail. Recently the custom house officer at Detroit seized several packages of these pins, and demanded for their release charges amounting to more than their value. This action, it appears, was prompted by a special circular from the Treasury Department at Washington to the collectors, requiring increased vigilance in regard to packages transmitted by mail—to prevent loss of revenue to the Department.

On being informed of the seizures, we wrote to the Secretary of the Treasury, explaining the objects of our Society in this matter, referring to past usage and also to the fact that these pins were only used for scientific purposes. In reply the Secretary holds that Entomological pins must take their place alongside of other pins and pay a duty of 35 per cent., and that the transmission of such packages by mail is contrary to law. At the same time he kindly instructed the collector at Detroit to waive the usual charges on seized goods and deliver the pins in his possession on payment of duties only. We shall hence in future be prevented from supplying our members in the U. S. with pins by parcel post.

On enquiring from the collector as to whether small quantities of pins might be sent by letter postage, we received in reply a copy of the circular sent from the Treasury Department. As this circular speaks only of *packages*, we presume that pins in small quantities enclosed in letters, covered by the usual letter postage, will not be interfered with.

Sheet cork, which is liable to a duty of 30 per cent., will also, we understand, be subject to seizure, but since the packages we send seldom exceed fifty cents in value, we do not know whether they would be regarded as of sufficient importance to warrant the trouble of the correspondence attending such seizures. On this point we have applied for information, but have failed to obtain it. Any packages of this sort sent in future will be at the risk of the parties ordering them. Either pins or cork can be safely sent in any quantities by express, subject to the duties mentioned.

CORRESPONDENCE.

CATOCALA MARMORATA.

Catocala marmorata may now safely be put down as one of the regularly settled species of this locality. An intimate friend and fellow hunter, in company with myself, took five examples this season, which, with four I took last year, makes nine in all, which is a pretty good showing for a single locality of an insect which, though seemingly diffused over a large territory, is nevertheless one of the rarest of the genus it so royally represents. Mr. Charles Dury, who took one last year, reports another

this year at Cincinnati; and Mr. Geo. W. Peck took one this season in New Jersey. This makes twelve in all that have been taken in the United States, besides the original one in the Collection of the Entomological Society of Philadelphia, that I am aware of. If others have taken it in other localities, I hope they will report. Some who have not seen the examples taken here and elsewhere, have hesitated to believe that they were the true *marmorata* of Edwards, but a glance at them is enough to convince any one of their identity. I have not seen the original type, but our examples tally exactly with the published description. It is a large, showy and uniformly defined species, entirely distinct, and cannot well be mistaken for or confounded with any other species.

JAMES ANGUS, West Farms, N. Y.

SPHINGIDÆ AT SUGAR.

I have taken the following Sphingidæ at sugar at Center, this season :

Sphinx choerilus.	Sphinx myron.
" kalmiæ.	" sordida.
" gordius.	" cinerea.
" hylaus.	" Harrisii.
" Abbotti.	" lineata.
" drupiferarum.	" luscitiosa.

JAMES S. BAILEY, M. D., Albany, N. Y.

DONATION TO ENTOMOLOGICAL SOCIETY OF ONTARIO.—We tender our sincere thanks to our esteemed correspondent, Mr. V. T. Chambers, of Covington, Ky., for a collection of named Micro-Ledidoptera kindly presented to our Society. This collection, which reached us in very fair order, consists of 66 species, and is a most welcome and valuable addition to the Society's cabinet.

The Locust Plague in the United States, by C. V. Riley, M. A., Ph. D.

This is an octavo volume of 236 pages, with 45 illustrations, including several maps; published by Rand, McNally & Co., Chicago. It is handsomely got up and contains much valuable information on this important subject; it is, in fact, a digest or reproduction in a compact form of the material contained in the author's several valuable reports on this insect to the Legislature of the State of Missouri. Price, in paper, \$1; cloth, \$1.25. Sent by mail by the publishers, prepaid, on receipt of price.

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